ISSUE 195 DEC/JAN 2009/2010

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TOP NEW TOOLS FOR 2010 p.68

Build this Classic Barrister's Bookcase

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- Chip & Dip Server p.50
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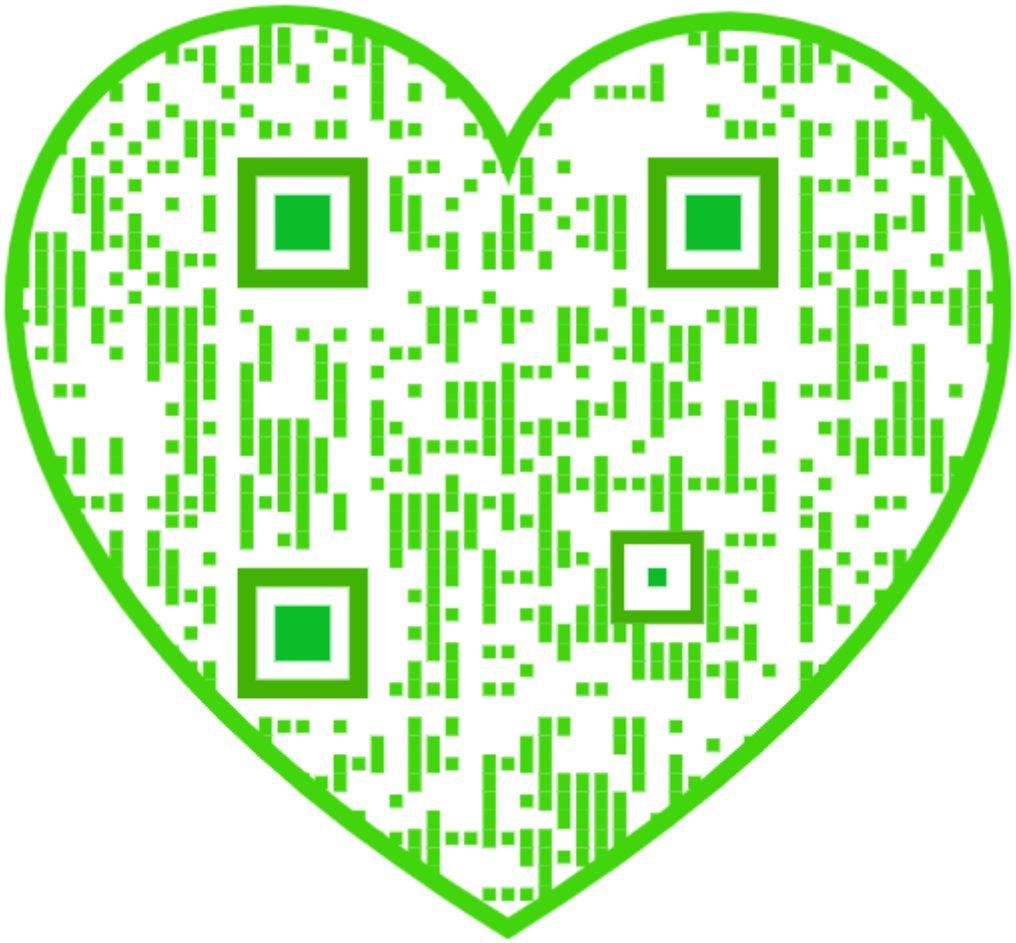

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- Approx. shipping weight: 558 lbs.

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- Rabbeting capacity: ½" • Max. depth of cut: ⅛"
- Cutterhead speed: 5000 RPM
- Deluxe cast iron fence size: 35"L x 5"H
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G0656

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- Motor: 2 HP, 110V, single-phase
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- Feed rate: 32 FPM
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- Cutterhead speed: 10,000 RPM
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- Spindle length: 3"
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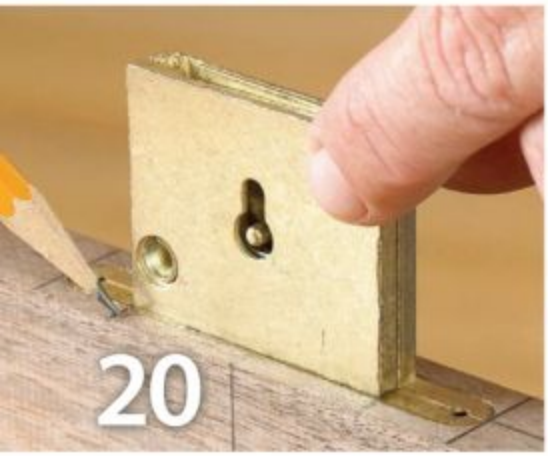

PROJECTS

18 Shop Project: Shelf-pin Drilling Jig
28 Barrister's Bookcase
38 Flat-panel TV or Game Cabinet
50 Chip 'N' Dip Tray
58 Curvy Jewelry Box
64 Scrollsawn Barnyard Puzzle

SKILL BUILDERS

20 How to Install a Mortised Lock
54 Get the Max from Your Plunge Router

TOOLS & MATERIALS

24 Wise Buys: Spindle Sanders
68 10 Top New Tools for 2010
78 Shop-Proven Products

DEPARTMENTS

6 Sounding Board
8 Shop Tips
16 Shop Monkey
45 Annual Article Index
72 Ask *WOOD*
92 What's Ahead

This seal is your assurance that we build every project, verify every fact, and test every reviewed tool in our workshop to guarantee your success and complete satisfaction.

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SHOW OFF THE GIFTS YOU BUILT

Before you wrap that handmade gift, take a few snaps of it and post them to the "Holiday Gifts 2009" photo gallery at woodmagazine.com/holiday2009. Last year, Vilas and Cheryl Schroeder of Marinette, Wis., crafted this gorgeous 14' shuffleboard table as a present to their daughter, Sarah, and her husband, Chad.

LEARN TO BUILD CABINETS

Why pay big bucks for flimsy shop cabinets when you can build rock-solid ones for less? We'll even help. Go to woodmagazine.com/betterwoodworking, then search for "cabinet." There, you'll find nearly a dozen downloadable videos about cabinetmaking.

WHADDAYA KNOW ABOUT WALNUT?

Before you build the Barrister Bookcase project on *page 28*, learn all about walnut—and how to work with it—at woodmagazine.com. Just type "walnut" into the search box and click "Search."

HOME-THEATER WIRING, SIMPLIFIED

Whether you build the Flat-panel TV Cabinet project on *page 38* or one of your own design, you'll need to connect it all and learn how to hide the wires. We've hooked up with the electronics experts at Crutchfield to teach you everything you need to know.

- Tips for Home A/V Cable Management woodmagazine.com/cables
- A Guide to Wall-mounting Your Flat-panel TV woodmagazine.com/flatpanel
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December/January 2009/2010 **Vol. 26, No. 7** **Issue No. 195**

We asked our staff:
What's your favorite hand tool?

Bevel-edged bench chisel. Nothing beats the feel of a super-sharp chisel slicing through wood and yielding just the result I'm looking for.

Lee Valley Apron Plane. It's a small low-angle block plane that fits in an apron pocket so it's always handy.

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My Pfeil chisels. I can hone a razor's edge that doesn't disappear after the first cut into white oak.

Stanley utility knife. Besides cutting, it's a great finesse tool for applying minute amounts of glue to a repair, scraping small areas, and doing general clean-up.

The shop plane I built. It feels good in my hand, and works well for smoothing parts.

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Part of the bench, all the appreciation

My wife enjoys gardening and has turned our backyard into a beautiful park-like setting with several places to sit and enjoy the fruits of her labors. So when my son and I saw the tree bench in issue 190 (May 2009), we built it as a Mother's Day gift for her. Because we don't have a large tree in our yard, we built half the bench, added arm rests on the ends for stability, and placed it around a flowering crab-apple tree. She loves it.

—Scott Tibbels, Omaha, Neb.

Half-size rockers for half-pint youngsters

I wanted to make a child-size rocking chair for my niece's first child, born this past year, so I built a smaller version of the rocker in issue 183 (May 2008). I made each part exactly half the size of those in the original plan, with a few exceptions: I made the seat slats wider, beefed up the rail and slat tenons to about three-quarter scale, and gave the curved rockers a T-shape for a wider footprint. So far, I've made four chairs, two each in cherry and oak. Thanks for the inspiration.

—Mark Wroblewski, LaSalle, Ill.

How about the random-orbit sander as an innovation?

Might I suggest another tool for your list of woodworking innovations in the past 25 years: the random-orbit sander. About 21 years ago, I saw a dual-action pneumatic sander at my brother-in-law's autobody shop, and I said someone should invent a sander like that for woodworking. A few months later, I saw my first electric random-orbit sander made for wood. Now a regular user, I most likely would not be a cabinetmaker if it weren't for this tool because it turned the worst part of cabinet building into an acceptable, reasonably pleasant task.

—Tom Kurth, Alma, Mo.

Upon further reflection, Tom, we should have included these sanders. Although German-based Festool invented the electric random-orbit sander more than 25 years ago, ROSs weren't widely available in the U.S. until the late '80s. And we're with you about its time-saving performance: We won't work without one, either.

—WOOD magazine editors

I made the switch on my machines

Reading your review of router-table power switches (issue 189, March 2009) inspired me to replace the push-button switches on my stationary machines because they were all different and often hard to push the "off" buttons. So I replaced them with Grizzly's Safety Paddle Switch (#G8988, $4; 800-523-4777, grizzly.com).

— Bill Tarleton, Lafayette, Calif.

HOW TO REACH US

For woodworking advice:
Post your woodworking questions (joinery, finishing, tools, turning, dust collection, etc.) on one of our online forums at woodmagazine.com/forums.

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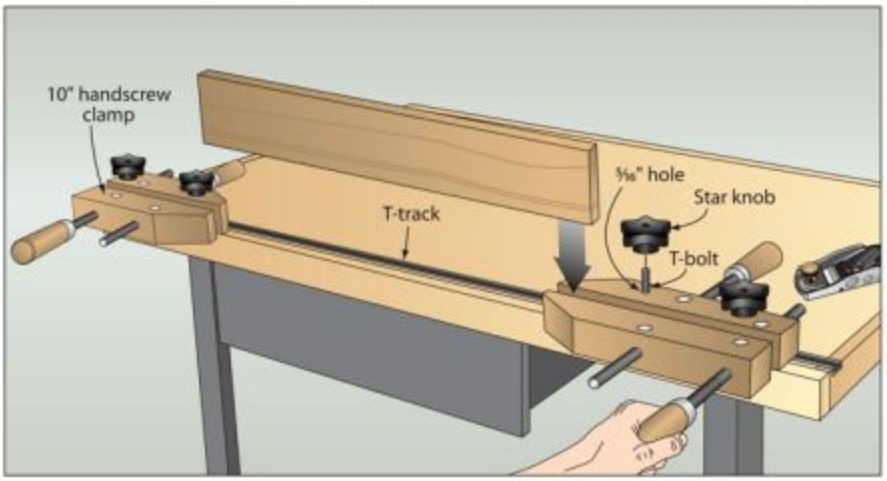
Shop Tips

Helping you work faster, smarter, and safer

Poor man's bench vise

I wanted a vise on my secondary workbench, but didn't want to pony up the cash for another heavy-duty one like on my main workbench. So I built this low-dough bench clamping system to hold oversized boards. After installing T-track near the edge of my bench, I drilled holes through 10" handscrew clamps, as shown below, to accommodate ¼×2½" T-bolts. The star knobs lock the clamps along the T-track to accommodate different board widths and lengths.

—Ken Minnaert, Olympia, Wash.

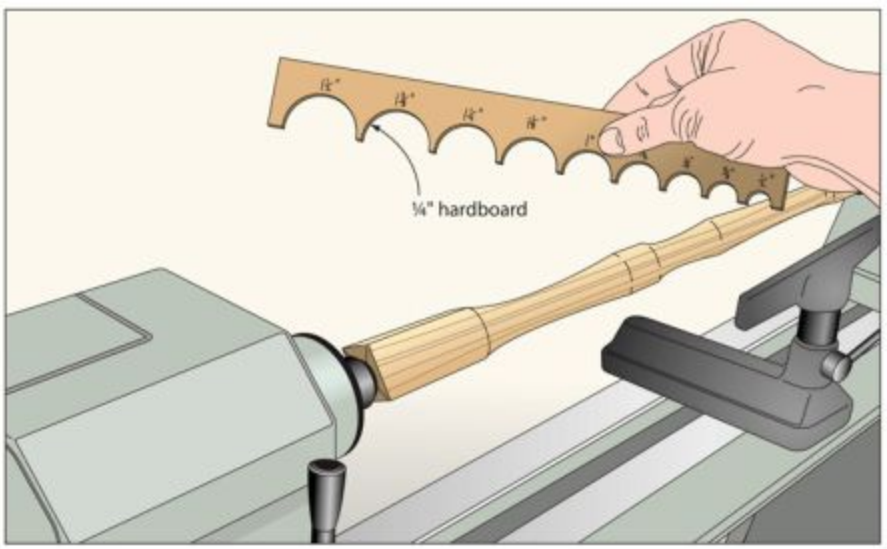


Speedy spindle gauge

While manually duplicating spindles on my lathe recently, I grew tired of constantly setting and resetting my calipers to check the various diameters along the workpiece. So I made this simple hardwood story board to speed up the process.

I drew a centerline on a scrap of hardboard and drilled holes of diminishing sizes with my Forstner bits. At the tablesaw, I cut to one side of the centerline, ripping the board in two and discarding the waste side. On the remaining board, I marked each half-circle with its diameter. By placing the desired-size hole over the spindle, I quickly check my progress at critical diameters.

—Byron Manthey, Hutchinson, Minn.



continued on page 10

The Top Tipster

Photo: Derek Pearson

Most of us would be honored to have a child named after us. But Dr. Ken Minnaert's 26-year tenure as president of South Puget Sound Community College culminated in the dedication of the college's *Kenneth J. Minnaert Center for the Arts*. Ken's roots, however, remain in the high school industrial arts classes he taught early in his career.

For sending a honey of a tip, Ken receives four Stanley Sweetheart hand planes. Great job, Doc!

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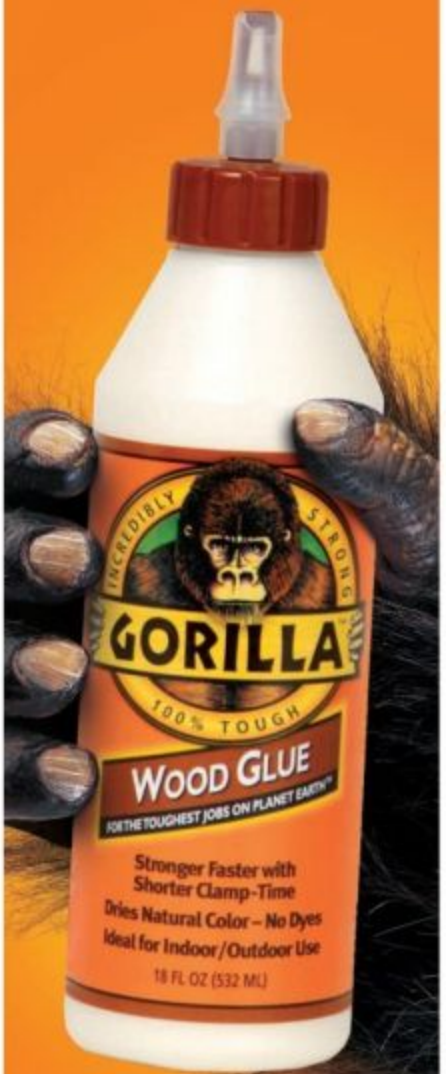

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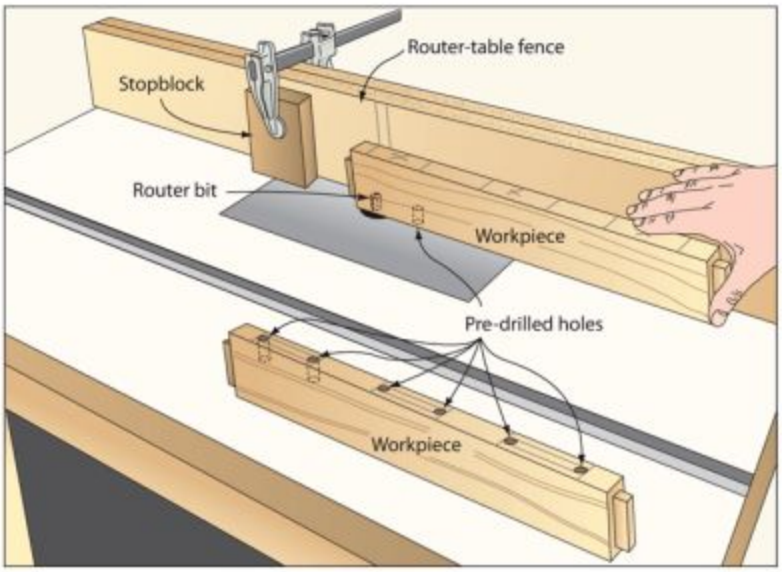
Shop Tips

No-fuss mortise setup

I like to cut mortises and stopped grooves using the router table. Here's my method for skipping the hassle of a time-consuming trial-and-error set-up process.

After laying out the mortise or stopped groove, use a Forstner bit to drill a hole at each end of the mortise or groove. Then at your router table, drop one of the holes over the router bit to set bit height, the fence position, and your first stopblock. Use the other hole to set the opposite stopblock, and you're set up to make the cut.

—Philip Extance, Bridgewater, Conn.



Two-in-one insert for extended life

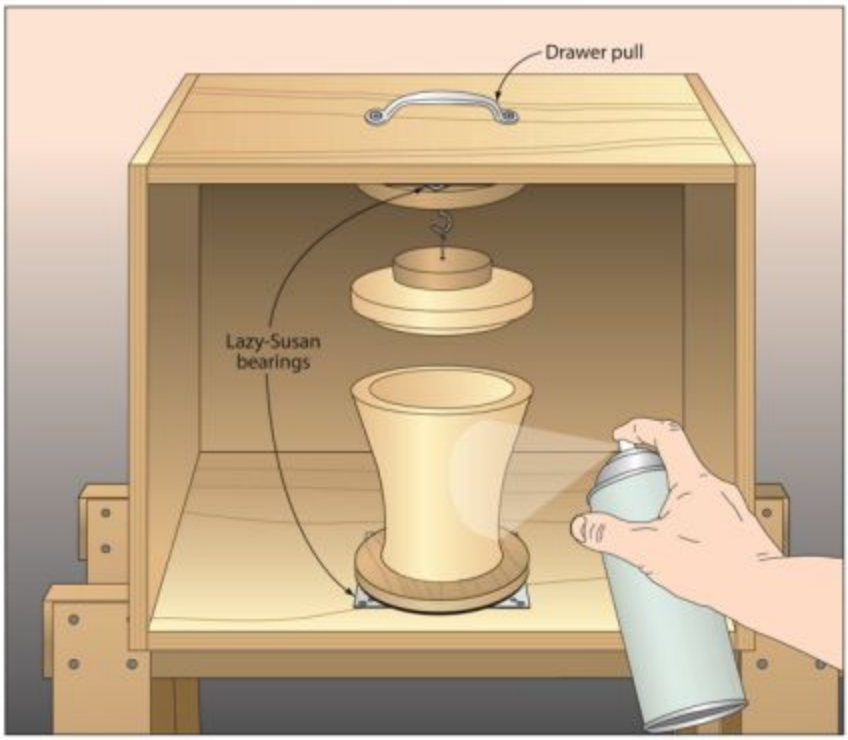
I use a zero-clearance insert for making nearly all tablesaw cuts, so I go through a lot of inserts. To extend the life of your inserts, simply rotate them. First use one side with your thin-kerf blade. When it gets chewed up enough to start losing effectiveness, designate that slot as the full-kerf side, and turn the insert around. The fresh side becomes zero-clearance for the thin-kerf blade once again.

—Craig Richardson, Ottumwa, Iowa

Go-anywhere mini spraybooth

I like to finish my small turned projects with aerosol spray lacquer, but don't like the fumes in my shop. So I made this portable spray booth from scrap plywood. The simple 12×16×16" box features two lazy-Susan bearings—one inside the top that holds a cup hook for hanging small parts, and one in the bottom for larger vessels. When it comes time to spray finish, I carry the box outside using the drawer-pull handle. The lazy-Susan bearings let me rotate the parts as I spray, for full coverage. Then, I just carry the box back into the shop for drying.

—Del Kramersmeier, Eagle Grove, Iowa



continued on page 12

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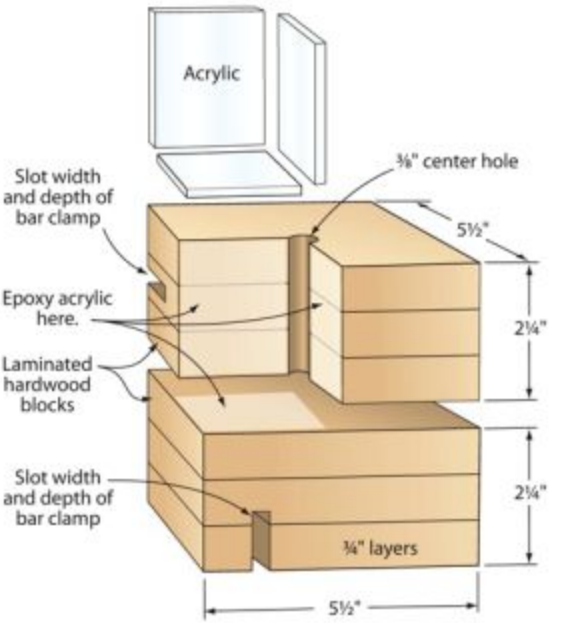
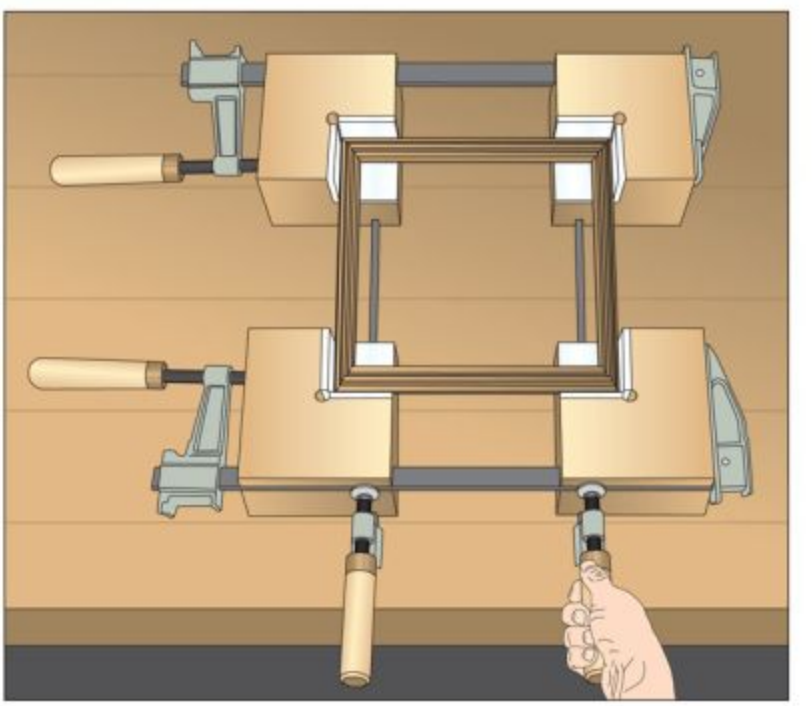
Shop Tips

Corner clamp converters

These corner clamping blocks help me squarely glue up mitered frames of almost any size. Each block consists of two pieces of 2¼" laminated hardwood. In the top piece, I drilled a ⅜" hole in the center to allow for glue squeeze-out. Then, backing the piece with an auxiliary fence on my miter gauge, I cut the squared notches by running it through the tablesaw on edge. Finally, I glue the top and bottom blocks together, and cut slots in the sides and bottoms sized to corral my bar clamps. (Cut on the sides shown *bottom*.) Scraps of acrylic epoxied to the notches ensure that any glue squeeze-out comes off.

—Max Young, Albion, Ind.





Plan easel is a step up

The plans for a recent project came printed on a 2×3' sheet of paper and were accompanied by about 10 pages of instructions. I wanted to keep everything handy for reference, but there is nowhere near the amount of vertical or horizontal space in my shop to display the plans. The solution: this temporary easel quickly constructed from an aluminum stepladder, a couple 2×3' pieces of plywood, and a few machine screws. I taped up the plans to put everything in easy view. The ladder still folds to get it out of the way. Or if I need to use it as a ladder, it's no problem to quickly remove the screws.

—Joel Simmons, McDonough, Ga.

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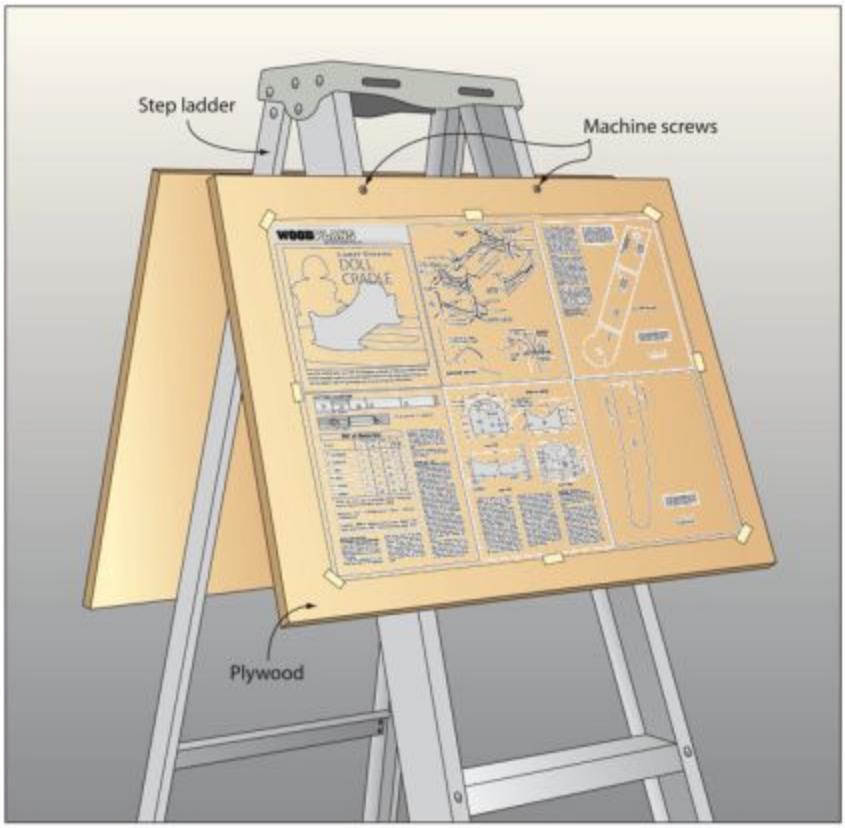

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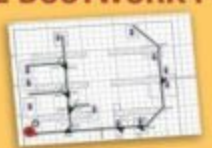

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Shop Tips

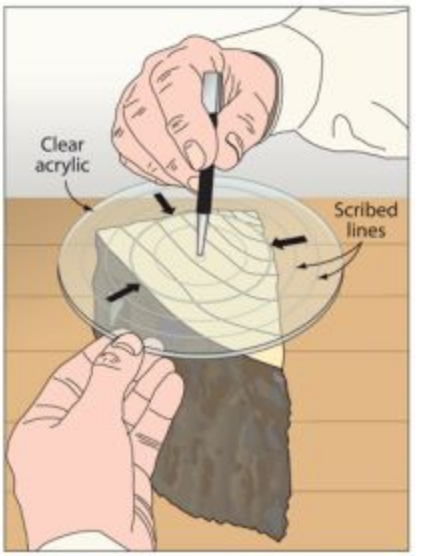
Sure-fire center finder for firewood

I've found some of the most beautiful turning blanks in the firewood pile. The good news: It's free. Bad news: It's hard to find the center of odd-shaped pieces. So I've come up with this trick to solve that dilemma.

Mount a piece of scrap wood to your lathe's faceplate. Then attach a piece of acrylic using double-faced tape and chuck it in your lathe. Turn the acrylic to a disc. Use a 3/32" bit in a tail-stock chuck to drill a hole through the centerpoint, and then scribe concentric circles on the disc at 1/2" intervals with a skew chisel.

To use the centerfinder, position it over the end of the stock, adjusting it until one of the circles is completely inscribed in the solid, usable portion of the wood. Then use a nail set or an awl to mark the center through the hole in the disc.

—Dick Ayers, Barron, Wis.



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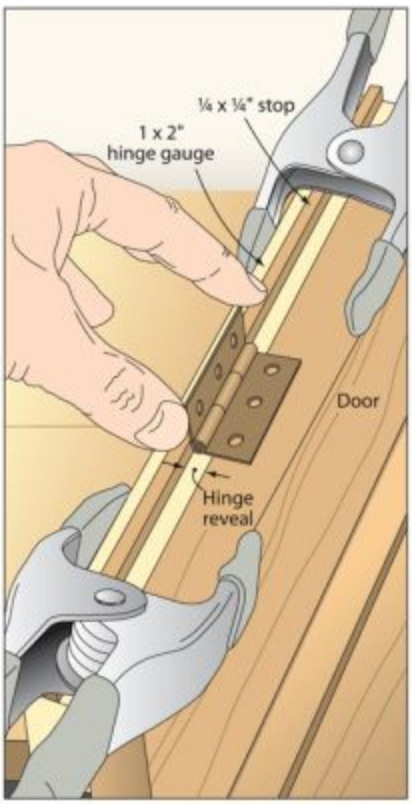
Always reveal your butt hinges evenly

Installing butt hinges for inset doors while ensuring a consistent hinge exposure on flush-mounted doors has always given me grief. This simple jig makes it easy, though. I made it out of a 1×2" strip of wood with a ¼×¼" stop strip glued to the edge, as shown. The location of the stop determines the reveal, or how much the hinge sticks out from the face frame. (I use ¼".)

To put it to use, simply clamp the guide to the face frame and butt the hinge against the fence to position it for drilling. Once finished, do the same on the door. When you attach the doors to the frame, they will come out flush every time.

—Charles Paukert, Cedar Creek, Neb.



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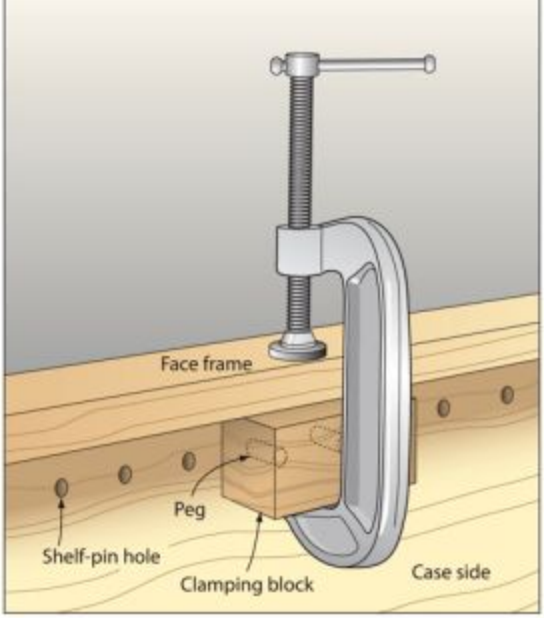
Running tight on clamps? Add pegs

With clamps running short on a cabinet job, I needed a good way to secure face frames. So I improvised, making a pegged block that fit into the shelf-pin holes in the case side. Then, the pressure from a c-clamp forced a tight glue joint between the frame and the case side.

—Daryl Sullivan, Cedar Falls, Iowa



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Precisely how precise?

During a visit to a woodworking friend's home, my pal asked me to check out his tablesaw. He was having "issues" with the set-up and wanted a second opinion.

There in his garage shop was a nice contractor's saw, complete with a shiny top, perfectly lubricated handwheel threads, and not a speck of dust on it. While I admired the gleaming saw, my friend passed me a board he had ripped on it. I sighted down the cut edge and noticed the smallest amount of roughness on the cut. Trust me; you really had to squint to see anything.

Next, he removed the saw's throat plate and blade, and went to a special drawer where he stored his precision measuring devices. Armed with his machinists dial indicator, he mounted it to the saw top, and gingerly pushed the instrument to the arbor flange. "There," he said, his voice heavy with disappointment, "The arbor's off by .002", and I'm having a bear of a time getting it perfect."

I looked at the board, noted the measurement, and studied the board again. "Looks good to me," I said.

He sighed, reassembled the saw, made another test cut and held the result up close to my face. "You see?!?" I looked again, and if I squinted just right, turned my head to the side, and positioned the board in the proper raking light, I could barely make out some roughness.

"I dunno... Still looks good to me."

He turned, shook his head and said, "You just don't get it, do you?" It was then that I remembered what he does for a living: My friend is an engineer.

Wood is pretty amazing stuff. It seems so substantial, yet it constantly moves in response to changes in temperature and humidity. Woodworkers for centuries have understood this and adapted their methods of work to account for it.

I get a kick out of woodworkers who routinely turn to machinist's tools to perfect the thickness of a tenon or the fit of a set of dovetails. If you cut the joint on a rainy day and assemble on a sunny one, you'll see the magic—and feel the frustration—of our preferred medium of work. Hey, we aren't machining parts for the Space Shuttle.

> "It was then that I remembered what he does for a living: My friend is an engineer."

And, getting back to my buddy's beef: Trying to get a perfect "glue-line rip" right off a tablesaw is an act of magic you don't need to attempt. Many experienced woodworkers will joint a board, rip it an extra 1/32" wide, then joint the ripped edge to smooth it and bring the board down to size.

Remember, when wood is involved, "close enough" is usually close enough. It's more fun to build projects than to worry about thousandths of an inch.

The Shop Monkey (aka Tom Iovino of Tampa, Fla.) blogs prolifically at woodmagazine.com/shopmonkey.

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Quick & Easy Jig

Shelf-Pin Jig

Use a plunge router to bore dead-on holes for shelf pins.

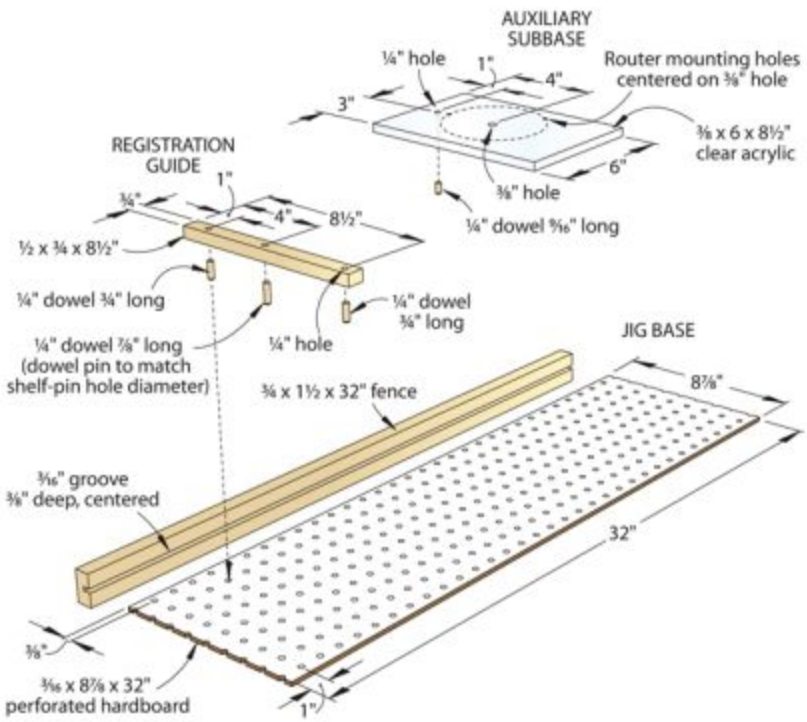
Rather than spend $30 or more for a commercial shelf-pin jig, make your own from scrap material. This simple jig, made from perforated hardboard, has a fence to reference against your workpiece edge. Add an auxiliary subbase—with an indexing pin—to your plunge router, and then simply bore perfectly spaced holes as needed. Make your jig long enough to bore all the holes in a particular workpiece without moving it. Or make a shorter one that you move down by indexing off holes you just made.

Begin by building the jig, as shown in the drawing *below*. For the auxiliary subbase, we used ⅛"-thick clear acrylic for best visibility, but you also can make it from medium-density fiberboard (MDF).

Scribe a straight line down the center of the subbase's longest axis. Bore a ¼" hole on the line centered with the row of holes closest to the fence and a ⅜" hole where the centerline intersects the fourth row of holes. Remove your router's regular subbase and center it on the ⅜" hole of the auxiliary base. Mark and bore holes for the mounting screws, including a counterbore or countersink to recess the screwheads. Sand a slight chamfer on one end of a ¼" dowel and then cut it to 9⁄16" long. Using super glue or epoxy, install this dowel into the first hole to serve as a registration pin. Now, mount this subbase to your router.

For those times when you need to reposition the jig, make a registration guide from a scrap of solid wood. Bore three ¼" holes and glue in the dowels as shown. The longer center dowel pins the jig into a previously routed hole.

To use the jig, clamp it to your workpiece. In your router, install an upcut spiral router bit the same diameter as the studs of your shelf pins. Set the depth-of-cut stop so it's slightly more than the length of the shelf-pin studs. This jig is set up to bore holes 4" from the fence; if you want holes closer to the edge of your workpiece, use double-faced tape to adhere a spacer, as shown *above*. Hold the jig alongside the part you're drilling, insert the subbase indexing pin into a hole, power up the router, and bore a hole. Insert the subbase pin into the next hole in the jig and bore again, stepping and repeating as needed.



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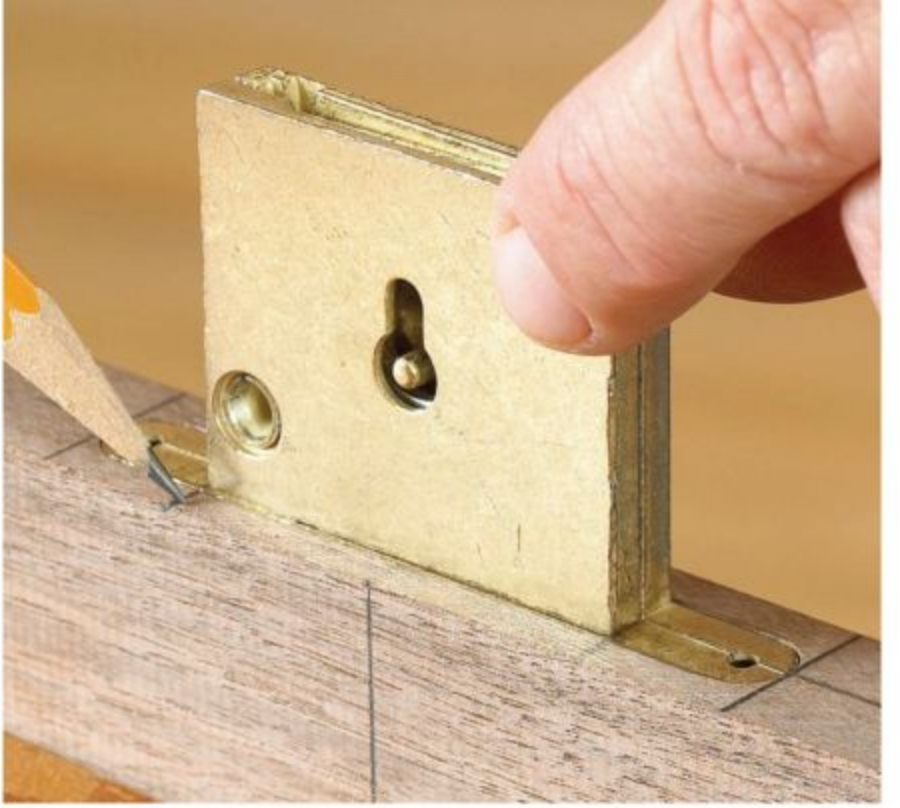


Embellishing your project with a mortised lock adds to both its functionality and appearance. Of course, it adds a little more complexity as well. Follow these simple steps to master the mortised lock.

Security starts with a shallow mortise

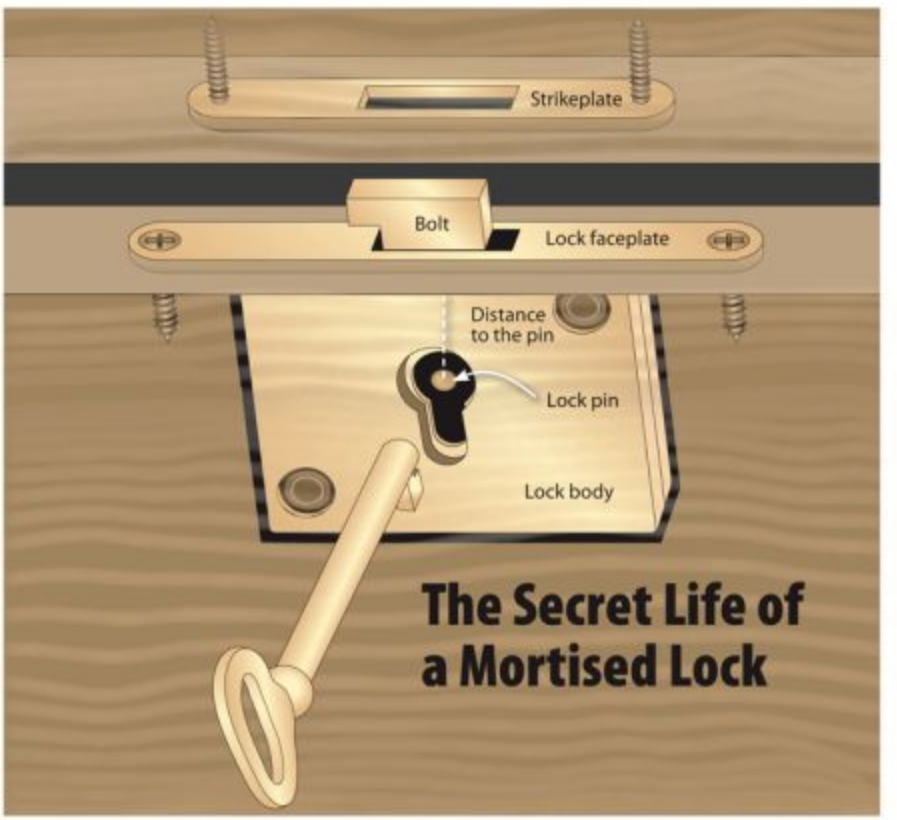
Nearly all the steps of installing a mortised lock remain the same regardless of its application. We'll use the drawer lock in the Barrister's Bookcase project on *page 28* to demonstrate this technique.

Start by marking a centerline on the top edge and face of the drawer front. Holding the lock against the face, center the lock pin (see drawing) and mark both ends of the lock faceplate on the drawer front's top. (Centering the lock body instead of the pin may place the keyhole off-center if the pin is not centered in the lock.)

In your drill press, install a bit that matches the width of the lock faceplate. (See "Which bit to use?" on *page 22*.) Set your drill press depth stop so the lock faceplate will sit flush with the top edge of the drawer front, and drill both ends of the marked mortise, with the circumference of the bit just reaching the marked lines [**Photo A**]. By drilling the ends first, you ensure they will drill out cleanly. If an end is left until last, the overlapping bit may chatter, leaving an imprecise or ragged hole. Don't move your drill press fence—you'll need that setting for the next mortise.

Make a scoring cut on the edges of your mortise with a straightedge and craft knife. Clean up the shallow mortise with the largest chisel that will

continued on page 22



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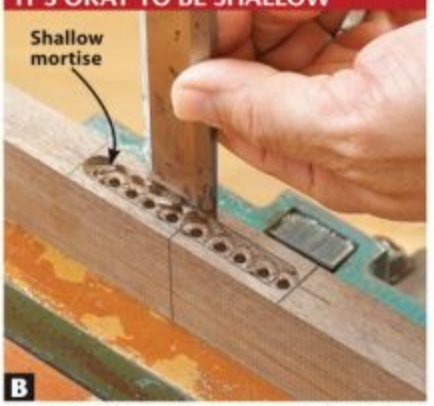


Taking care to keep the chisel perpendicular to the drawer edge ensures a tight fit.

KNOW YOUR VERTICAL LIMITS

Be sure to drill your keyholes just slightly larger than the tip of the key to allow for fit.

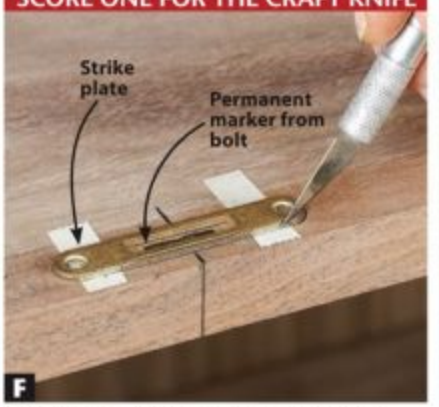
FILLER AND DRILL'ER

Inserting a shim into the mortise while drilling the keyhole prevents blowout.

GIVE IT A TWIST

Twist the key to transfer the marker ink on the bolt to where the strike plate should go.

SCORE ONE FOR THE CRAFT KNIFE



Scoring the outline of the strikeplate will help to keep your chisel on track.

STRIKE PLATE PLACE

Clean the edge of the shallow mortise with a chisel; then check the fit of the strikeplate.

fit [**Photo B**]. Invert the lock to check the faceplate depth—if the mortise isn't deep enough, use a narrow chisel.

With the lock inverted in the shallow mortise, transfer both ends of the lock body to the rail edge [**see opener**]. After setting your drill press and bit to the same depth as the lock body, prepare to drill the deep mortise. Unlike the shallow mortise, begin drilling both ends of the deep mortise by *centering* your drill bit over the end lines rather than abutting the circumferance of the bit to the edge. This allows the mortise to accomodate the squared edges of the lock body. Chisel and clean up the deep mortise to fit the lock body.

Eyeball the keyhole

Using the centerline on the face of the drawer front, center the tip of the key and mark its vertical limits [**Photo C**]. Insert a filler shim in place of your lock while drilling the keyhole [**Photo D**]. Insert the lock, drill the appropriate pilot holes, and secure with screws.

Coordinate the plate

To quickly and accurately mark the location of your strike plate mortise, generously coat the end of the bolt with a permanent marker, close the drawer, and turn the key to engage the bolt against the corresponding rail [**Photo E**]. With double-faced tape, center the strike plate over the mark and score the outline with a craft knife [**Photo F**].

Using the same procedure as with the lock faceplate, drill a shallow mortise [**Photo G**]. Mark and drill the deep mortise to allow for the bolt to fully engage when turned. If the bolt operates with a hooking motion rather than strictly vertical, you'll have to lengthen the deep mortise to accommodate the bolt's movement. Secure the strike plate with screws.

Which bit to use?

While drilling a mortise, a Forstner bit drills cleanly, without chatter, and the overlapping holes leave less waste to remove later with a chisel. For our project, however, we needed to use a hand drill to mortise the strike plate inside the drawer opening—and a Forstner bit won't accept a stop collar. So our second-best option was a brad point bit, which still allows for some overlap and can be marked for consistent depth with an ordinary stop collar. If you don't have a brad-point bit to match the plate's width, you can make it work by separating each hole by ¼", and chiseling away the remainder.

Forstner bit

Brad point bit

Written by **Nate Granzow** with **Jeff Mertz**
Illustration: **Tim Cahill**

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Wise Buys

Our Editors Test

Why buy?

Nothing beats a spindle sander for smoothing curved edges. Because the spindle oscillates up and down as it spins, it sands efficiently with greater stock removal, less burning, and longer abrasive life than you get with a non-oscillating drum. These benchtop models will handle nearly any curve-sanding task, for a fraction of the cost of a heavier floor model. We tested seven models and recommend the four below. All have sufficient power, come with at least four sanding drums, and include onboard storage for all parts.

Benchtop Spindle Sanders

GRIZZLY #G0538, $150

6 sanding drums: ½", ¾", 1", 1½", 2", and 3" in diameter
Includes: 6 insert rings, wrenches
Weight: 34 lbs

Editor test-drive:

The Grizzly G0538 features a 14×20" laminate-covered MDF top with the spindle offset. I like that, because most of the time I'm working on the right side of the spindle. Despite its small size, it sands with gusto while still being easy to finesse. My shop-vacuum hose connected easily to the 2½" port below the table and sucked up all the dust. I had to anchor it to my workbench, though, because the lightweight unit scooted around when unsecured.

—Tested by Jeff Mertz, Design Editor

To learn more:

800-523-4777; grizzly.com

RIDGID #EB4424, $200

5 sanding drums: ½", ¾", 1", 1½", and 2" in diameter
Includes: 4 insert rings, drum washers, belt-sanding attachment, workpiece stop, hex wrenches
Weight: 40 lbs

Editor test-drive:

Not only is this machine nearly unstoppable as an oscillating spindle sander, it's also a 4×24" oscillating edge sander. The belt drive fits into the same drive shaft as the drums, and provides about 8" of working belt length. It takes about 30 seconds to make the change to spindle sanding. The front of the aluminum table tilts down to 48°. My shop vacuum hooked up easily to the 2½" dust port and gathered in all but a little dust behind the drums.

—Tested by Dave Campbell, Deputy Editor

To learn more:

866-539-1710; ridgid.com

CRAFTSMAN 21500, $280

6 sanding drums: ½", ¾", 1", 1½", 2", and 3" in diameter
Includes: 6 insert rings, drum washers
Weight: 58 lbs

Editor test-drive:

There's nothing fancy about this unit, but it does everything I need a spindle sander to do. The 18" diameter cast-iron table provides plenty of worksurface, and beefs up the vibration-eliminating weight to 58 lbs. The Craftsman 21500 has a 3"-diameter spindle, something Ridgid and General International don't offer. I force-fed hard maple and cherry against the spindles and could not bog it down. The 2½" dust port fit my shop vacuum hose precisely for good dust collection.

—Tested by Lucas Peters, Multimedia Editor

To learn more:

800-383-4814; craftsman.com

GENERAL INTERNATIONAL 15-220-M1, $430

5 sanding drums: ¼" ½", ⅝", 1½", and 2" in diameter
Includes: 4 insert rings, wrenches
Weight: 81 lbs

Editor test-drive:

Why pay this much for a benchtop spindle sander? Because the 81-lb heft of a rugged cast-iron top and heavy steel base eliminates vibration, and the ½-hp motor—twice as big as the competitors—powers through wood without a hint of stalling. I like the test-tallest 5½" sanding drums (other makes are 4½") for those rare occasions when I need to sand a workpiece that large. The table tilts to 45° for angled work. And there's an adapter included to hook up a 4" dust hose to the 2" port.

—Tested by Craig Ruegsegger, Multimedia Editor

To learn more:

888-949-1161; general.ca

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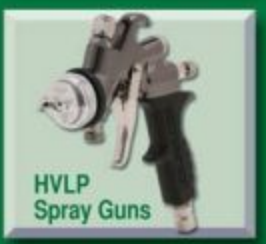

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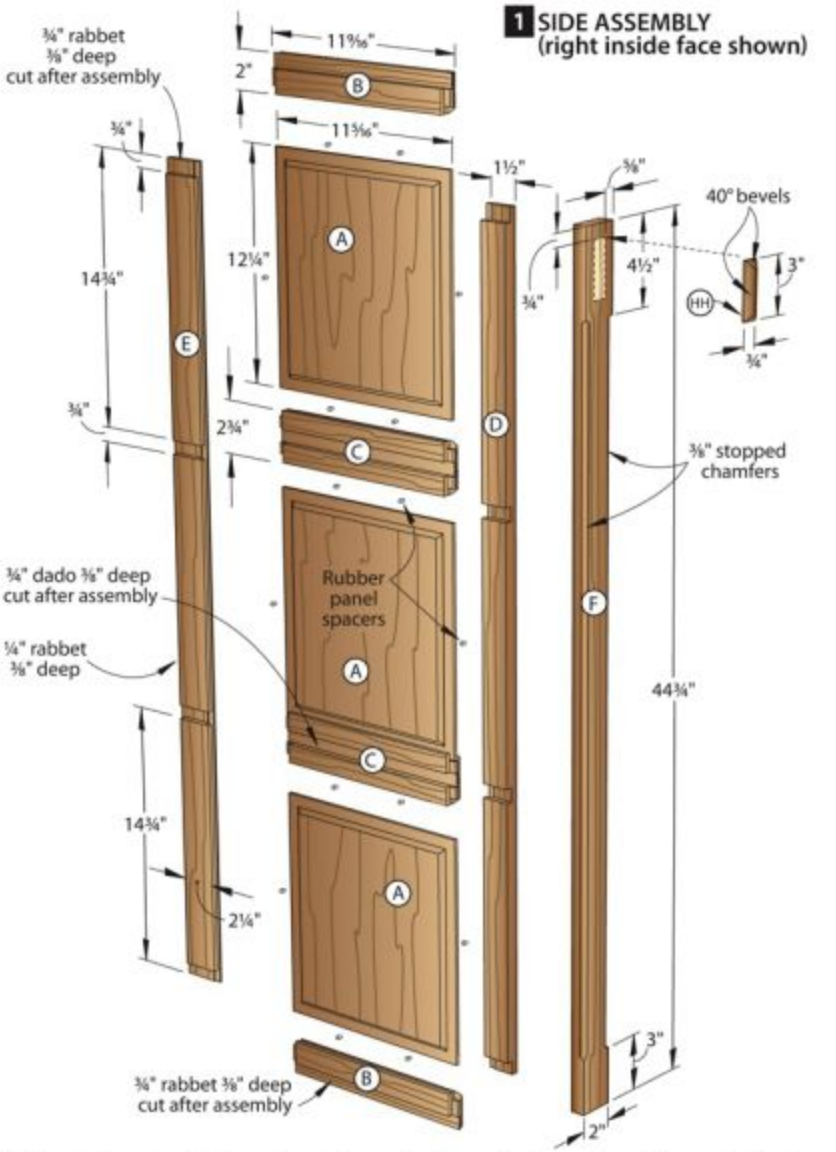
Barrister's Bookcase

Overall dimensions: 36¼" wide × 16½" deep × 51¾" high.

AT A GLANCE

- Glass doors pivot up and into the case quickly.
- Drawer holds hanging file folders.
- A dado blade, rail-and-stile router bits, and raised-panel bit with back cutter take care of the joinery.

Our twist on this classic project includes a drawer at the bottom to keep files close at hand. Even fully loaded, it rolls in and out easily on heavy-duty drawer slides. The drawer-box joinery requires just a single setup on the tablesaw explained in this article and demonstrated in a free online video at woodmagazine.com/simpledrawer.

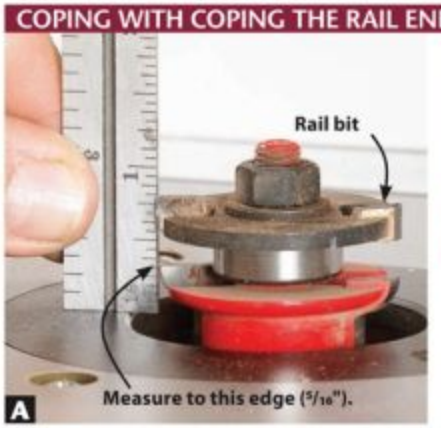


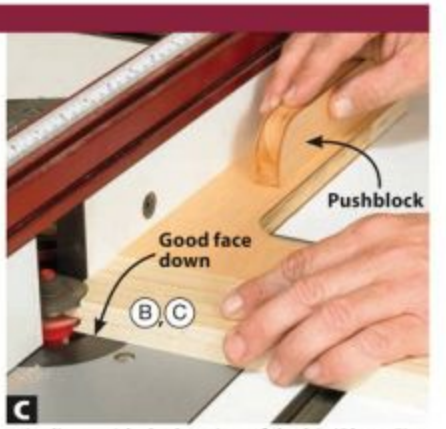
Every case has two sides

1 Begin by gluing up stock for the panels (A) [**Materials List**, *page 36*]. While the panels dry, rip ¾" stock for the top/bottom rails (B), center rails (C), front stiles (D), rear stiles (E), and facing (F) [**Drawing 1**]. Set up a stopblock and auxiliary fence on your miter gauge and cut the top/bottom rails and center rails to length. Reset the stopblock and cut the front stiles, rear stiles, and facing to length. Set the facing aside for now.

2 In your table-mounted router, set up the rail router bit with the bearing flush to the fence face [**Photos A, B**]. Cut the cope profile on the ends of the top/bottom rails (B) and center rails (C), backing up each workpiece with a push-block [**Photo C**].

COPING WITH COPING THE RAIL ENDS





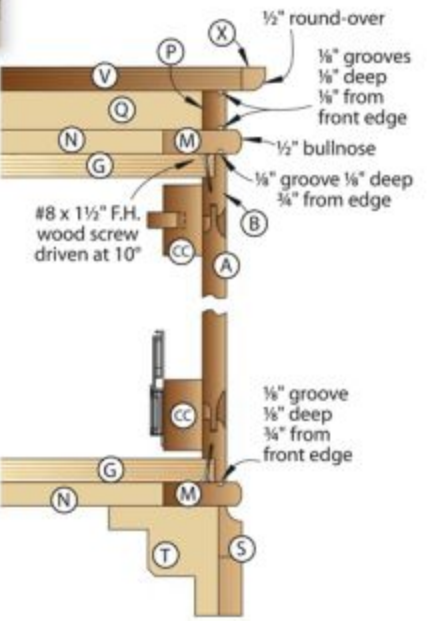
Set the upper edge of the rail bit's lower cutter 5/16" above the tabletop (*Photo A*). Then adjust the fence so it aligns with the bearing of the bit (*Photo B*). Using a pushblock to steady the rails and prevent tear-out on the back edge (*Photo C*), rout the rails with the good face down on the tabletop.

SHOP TIP

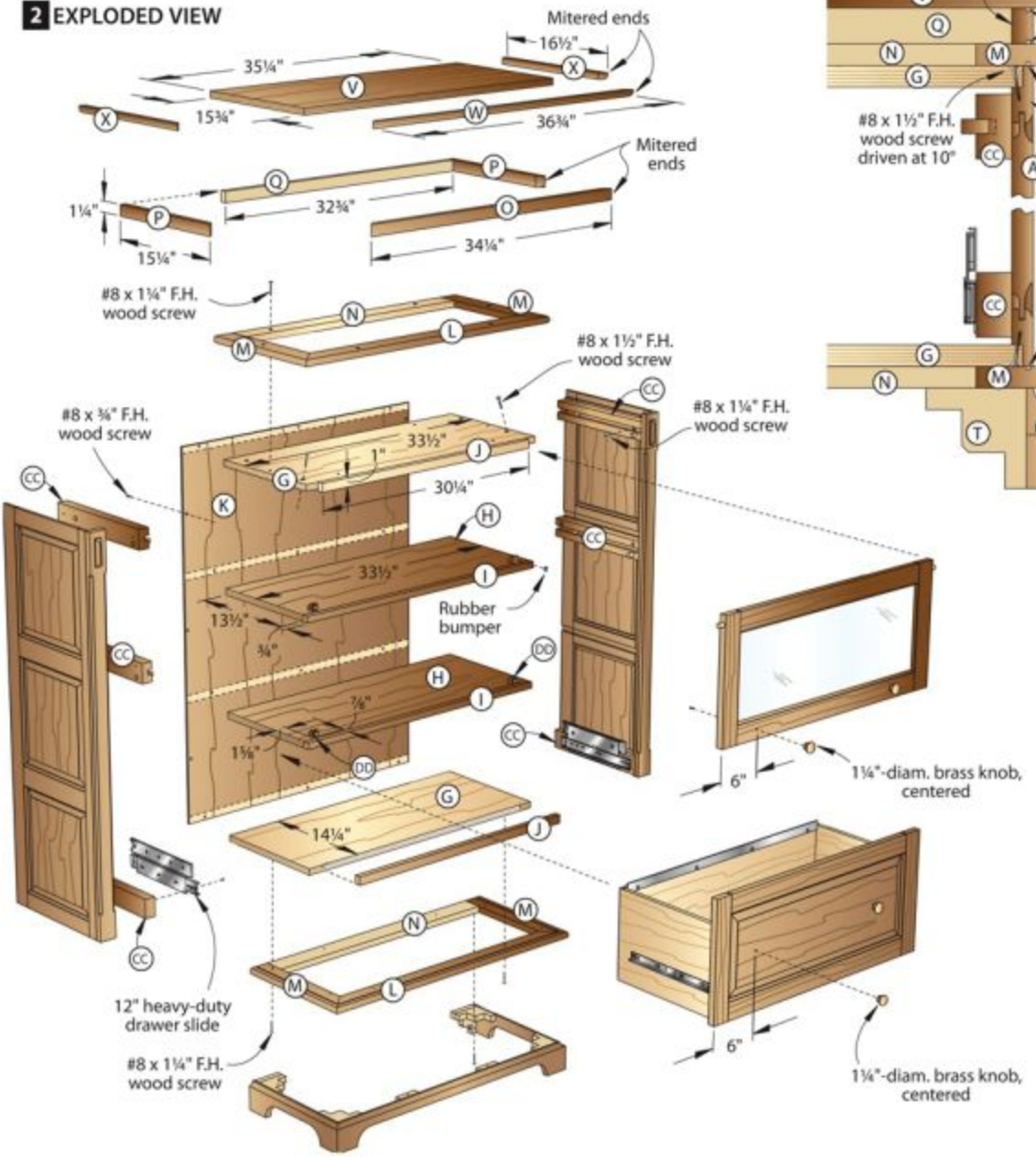
Sticking the setup

Get perfectly flush faces on the rails (B, C) and stiles (D, E) without measuring. Simply set the height of the stile bit by using a coped rail as a guide. Adjust the bit so the slot cutter aligns with the tongue on the end of the rail.

2a FRONT SECTION VIEW


½" round-over
⅛" grooves ⅛" deep ⅛" from front edge
½" bullnose
⅛" groove ⅛" deep ¾" from edge
#8 x 1½" F.H. wood screw driven at 10°
⅛" groove ⅛" deep ¾" from front edge

2 EXPLODED VIEW

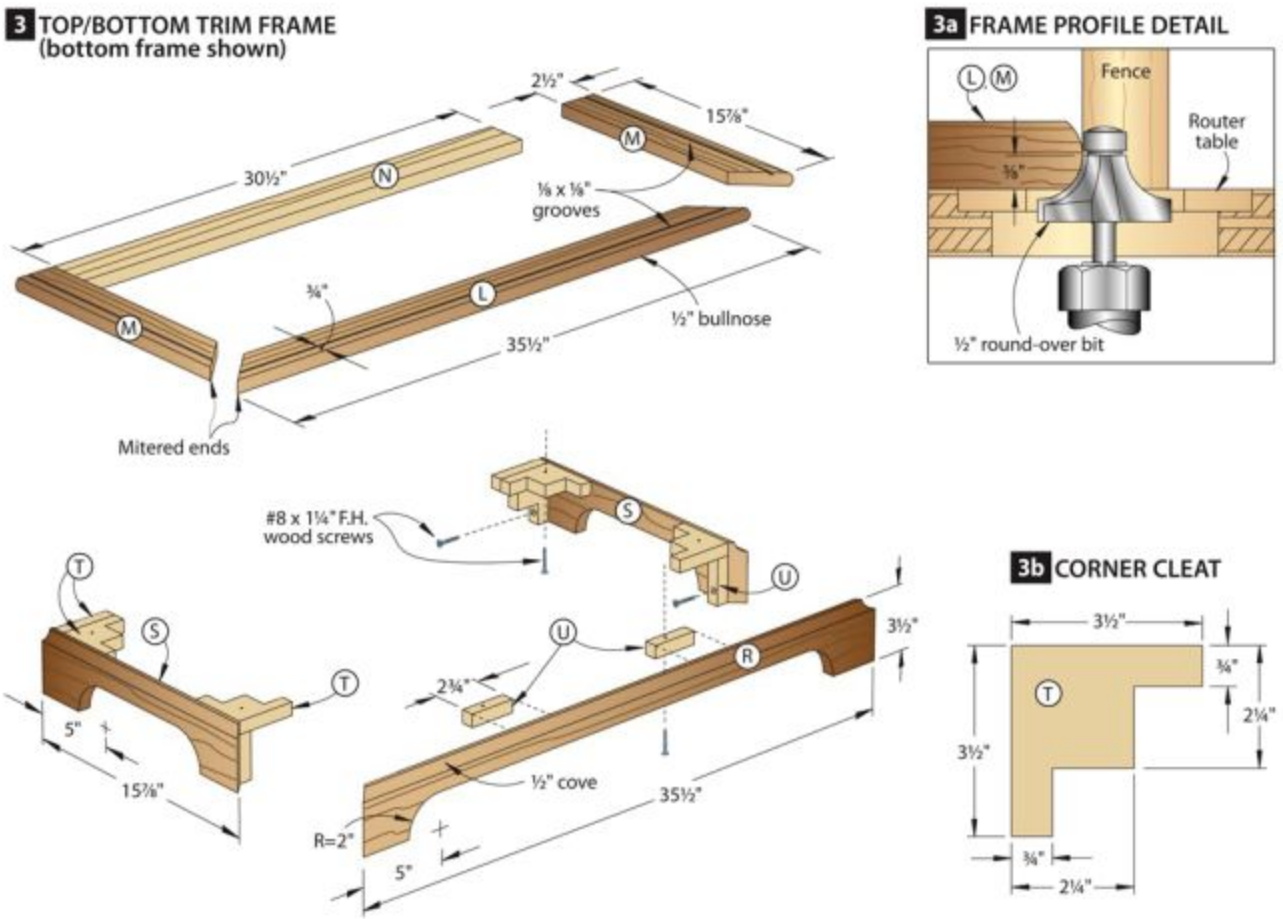


3 Install the stile bit in the router, adjust the bit height [**Shop Tip,** *above*], and set the fence flush with the bearing. With the good face down, rout the inside edges of the top/bottom rails (B), front stiles (D), and rear stiles (E), and both edges of the center rails (C).

4 Dry-fit the rails (B, C) and stiles (D, E). Position the center rails (C) to create three openings of equal length.

Quick Tip! Marks that stick with it. To help realign pieces quickly during glue-up, place painter's tape across the joint of each center rail and stile. Measure the width and height of an opening and add 9/16" to each dimension. Retrieve the panels (A) and cut them to these dimensions.

5 Set up a raised-panel bit with back cutter in your table-mounted router and cut the profile around each panel



(A). Dry-fit the panels, rails (B, C), and stiles (D, E) and check the fit.

6 Disassemble the parts, sand the panels to 220 grit, and apply a finish to them. (We wiped on one coat of boiled linseed oil topped with a satin-finish polyurethane. A second coat of poly will be added after the cabinet is completed.) Sand the stile profiles, then assemble the sides (A–E) [**Photo D**], inserting rubber panel spacers in the grooves in the frames [**Drawing 1**].

Line up the pieces of painter's tape to position the rails (C) quickly during glue-up. Cauls protect the edges of the stiles (D, E).

Tie the sides together

1 Mount in your tablesaw a dado blade matching the thickness of the shelves (H), and attach an auxiliary fence to the rip fence. With part of the blade housed in the auxiliary fence, cut a rabbet along the back edge of each rear stile (E) [**Photo E, Drawing 1**].

2 Readjust the fence so the exposed blade width equals the thickness of the top/bottom panels (G). Rabbet the inside top and bottom of each side assembly (A–E). Remove the auxiliary fence, reset the rip fence 14¾" from the blade, and cut two dadoes across each side assembly [**Photo F, Drawing 1**].

SHOP TIP

Routing perfect stopped chamfers

This simple setup guarantees matching chamfers on each edge of the facing (F). Start by using double-faced tape to attach a T-shaped block to the router-table fence. The width of the vertical stop equals the diameter of the bit bearing plus two times the size of the chamfer. With a ½" bearing and a ⅜" chamfer, make the stop 1¼" wide. Center the stop over the bit. Next, tape a 3"-long stopblock to one end of the facing and a 4½"-long stopblock to the other, flush with the ends. To rout the chamfers, move the facing into the bit so the left stopblock touches the left side of the T (*photo*) and push it along the fence until the right stopblock contacts the T. Flip the facing around and rout the opposite edge. Attach the stopblocks to the other facing and repeat the procedure for four perfectly matched chamfers.

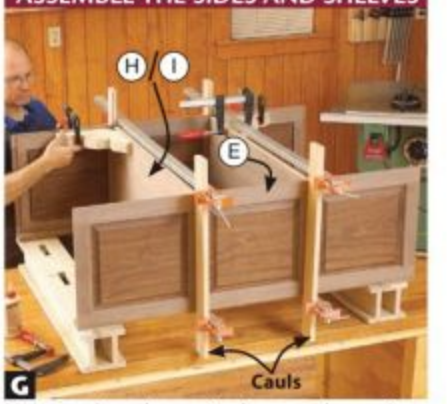
RABBET THE BACK STILE

Cut a ¼" rabbet ⅜" deep along the rear edge of the rear stile (E) on each side assembly. The rabbet accepts the back (K).

ONE SETUP FOR TWO DADOES

With each end of each side assembly (A–E) against the rip fence, cut a dado using a long miter-gauge fence to steady the work.

ASSEMBLE THE SIDES AND SHELVES



Using cauls and squaring braces, glue and clamp the shelves (H/I) between the side assemblies (A–F).

3 Retrieve the facing (F) and rout stopped chamfers on each front edge [**Drawing 1; Shop Tip** on *page 31*].

4 Glue the facing (F) to the front of each side assembly (A–E) with the ends and outside edges flush. ***Note:*** *Make sure the 4½" unchamfered end is at the top and that the assemblies are mirror images* [**Drawing 1**]. Finish-sand to 220 grit.

5 Cut the top and bottom (G) and shelves (H) to size. Cut the shelf edging (I) to size and glue and clamp it in place [**Drawing 2**]. Finish-sand the shelves (H/I) through 220 grit, then assemble the sides (A–F) with the shelves [**Photo G**]. Add the top and bottom [**Shop Tip,** *below right*; **Drawing 2a**].

6 Cut the top/bottom trim (J) to fit between the facings (F). Glue the trim in place, flush with the top face of the top panel and the bottom face of the bottom panel [**Drawing 2**].

7 From ¼" plywood, cut the back (K) to fit between the rabbets in the side assemblies (A–F), and flush with the top face of the top (G) and bottom face of the bottom (G) [**Drawing 2**]. Drill holes and screw the back in place to check the fit, then remove it to allow easier access during the rest of construction.

A top and bottom add appeal

1 From ¾" stock, cut the top/bottom trim fronts (L), sides (M), and backs (N), and the extension frame front (O), sides (P), and back (Q) to width, and ½" longer than listed. Rout a bullnose on one edge of the top/bottom trim front and sides [**Drawing 3a**]. Then cut ⅛" glue-relief grooves on one face of these pieces [**Drawings 2a and 3**] and on both edges of the extension frame front and sides.

2 Miter-cut both ends of the top trim front (L) so it is 1¼" longer than the case width. Miter one end of each top trim side (M). Clamp the trim front to the top of the carcase centered side-to-side and with a ⅜" overhang in front. Place the trim sides against it. Mark the trim sides' final length [**Photo H**], crosscut them to length, and glue and screw the trim front and sides to the carcase. Cut the top trim back (N) to length to fit between the trim sides [**Drawing 3**] and glue and screw it in place. Repeat this process for the bottom trim frame. Sand the frames to 220 grit.

3 Measure the distance the top frame (L–N) overhangs the top rails (B) and facing (F) [**Drawing 2a**]. Transfer this dimension to the top faces of the top trim front and sides, parallel with their outside edges. As with the top and bottom frames, miter the extension frame front (O) and sides (P) to fit along the lines [**Drawing 2a**]. Sand the front and sides to 220 grit, then glue them in place. Cut the extension frame back (Q) to length to fit between the sides, finish-sand it, and glue it in place.

4 Miter-cut the base front (R) to length, then miter-cut and crosscut the base sides (S) to length [**Drawing 3**]. Rout the ½" cove along the upper edge of these pieces, then lay out the profile. Bandsaw the profile and sand it smooth.

5 Bandsaw six corner cleats (T) to size and shape [**Drawing 3b**]. Glue up the base front (R) and sides (S) using a cleat in each corner [**Photo I**]. Glue the remaining cleats to the back end of the sides [**Drawing 3**], then glue and screw a support cleat (U) behind each miter joint [**Drawing 3**]. Drill countersunk shank holes in two more support cleats and glue them in place, evenly spaced on the back face of the base front.

6 Turn the case upside down and attach the base to the case, flush at the back and centered side-to-side. Drill countersunk shank holes through the corner cleats (T) and drive screws through them and the front support cleats (U) [**Drawing 3**].

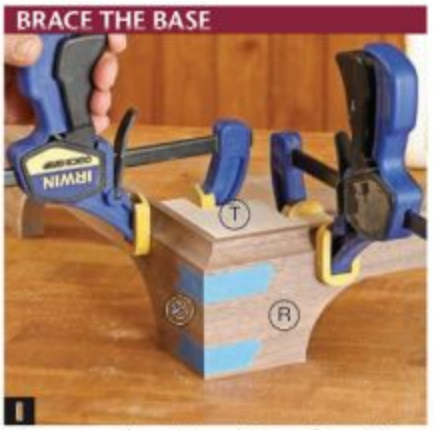
7 Cut the cap panel (V) to size, and the cap front trim (W) and side trim (X) to width and ½" longer than listed. Then miter the trim pieces to fit around the cap panel [**Drawing 2**]. Rout a ½" roundover on the bottom edge of the trim [**Drawing 2a**]. Then finish-sand the cap assembly and glue it to the extension frame (O–Q) flush at the back and centered side-to-side.

SHOP TIP

Know the angles

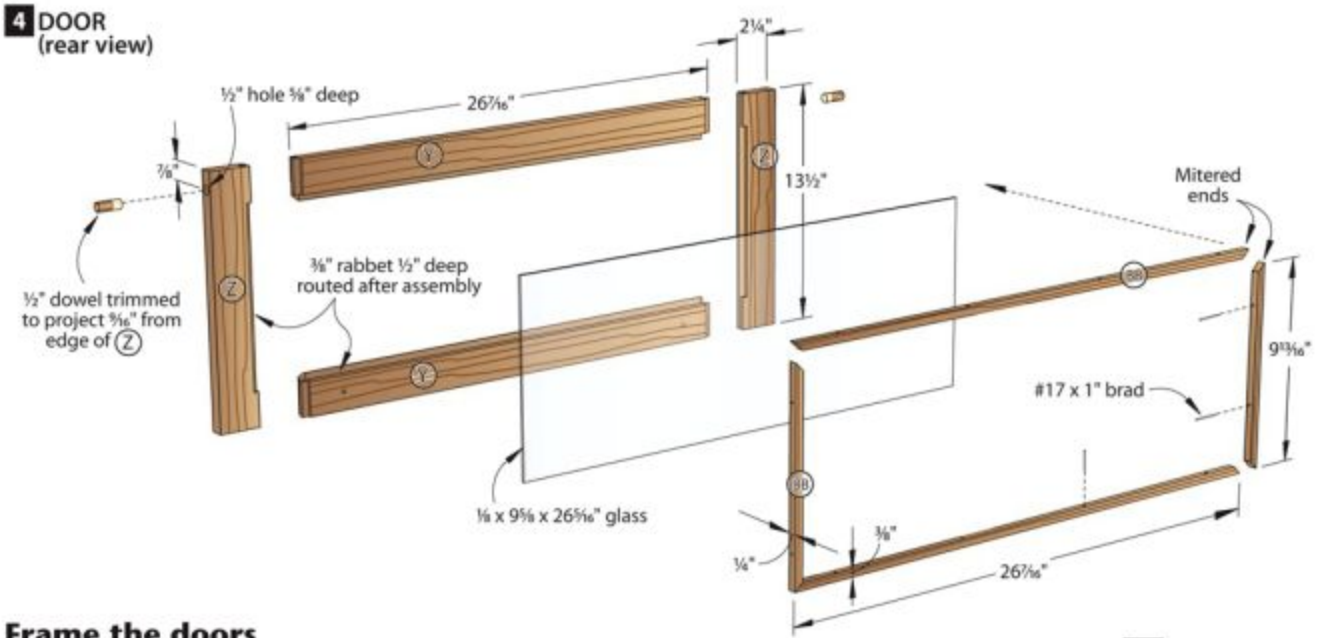
Driving a screw straight down into the ⅜"-deep rabbet in the top and bottom rails (B) risks blowing out the inside face of the rail. Instead, angle the screw slightly to the outside of the rail to prevent this [**Drawing 2a**]. Use a scrap block mitered at 10° to help guide your bit at the proper angle while drilling the pilot holes [*right*].

With the trim front (L) clamped to the case, place the mitered end of a side (M) against it and mark the final length of the side.



Glue corner cleats (T) to the base front (R) and sides (S) to reinforce the miter joint and to hold the assembly square.

Secure the middle door supports (CC) against the bottom of the shelf (H). Use ¼" spacers to position the upper door supports.



Frame the doors and a false front

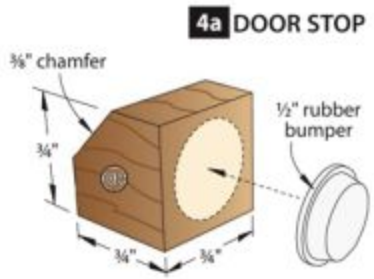
1 Measure the openings for the doors and drawer. Crosscut the rails (Y) 3¹³⁄₁₆" shorter than each opening's width, and the stiles (Z) ¼" shorter than each opening's height. ***Note:*** *Each pair of stiles may not be the same length. If this is the case, mark them to indicate which opening they fit.* Drill ½" holes ⅜" deep in the door stiles [**Drawing 4**]. Glue up stock for the drawer panel (AA) and set it aside for the moment.

2 As you did with the side assemblies (A–F), use your rail-and-stile router bits to cut the joinery on the rails (Y) and stiles (Z). Cut the drawer panel (AA) to size, then rout the profile around it [**Drawing 5**]. Finish-sand the panel to 220 grit, then apply a finish.

3 Glue up the doors, checking that the frames are square and flat. Then glue dowels in the stiles (Z) and cut them to length [**Drawing 4**]. Glue up the drawer frame with the panel (AA), placing rubber spacers in the grooves [**Drawing 5**].

4 After the glue dries, mount a ⅜" rabbeting bit in a handheld router and rabbet the back face of the door frames to accept the glass and stops. Chisel the corners square, then finish-sand the doors and drawer false front (Y/Z/AA). Cut four 38" lengths of glass stop (BB), sand it through 220 grit and set it aside.

5 Glue up stock for the door/drawer supports (CC) and cut them to size. Set two of them aside for use with the drawer later. In the four remaining door supports, cut a ⁵⁄₁₆" groove and drill two ½" holes and two ⅜" countersunk shank holes [**Drawing 6**], making sure you end up with two mirrored pairs. Sand the supports to 220 grit, then cut two lengths of ½" dowel for each door support [**Drawing 6**]. Glue the 2"-long dowels in place below the grooves. Set aside the 1¼"-long dowels until the doors are installed.

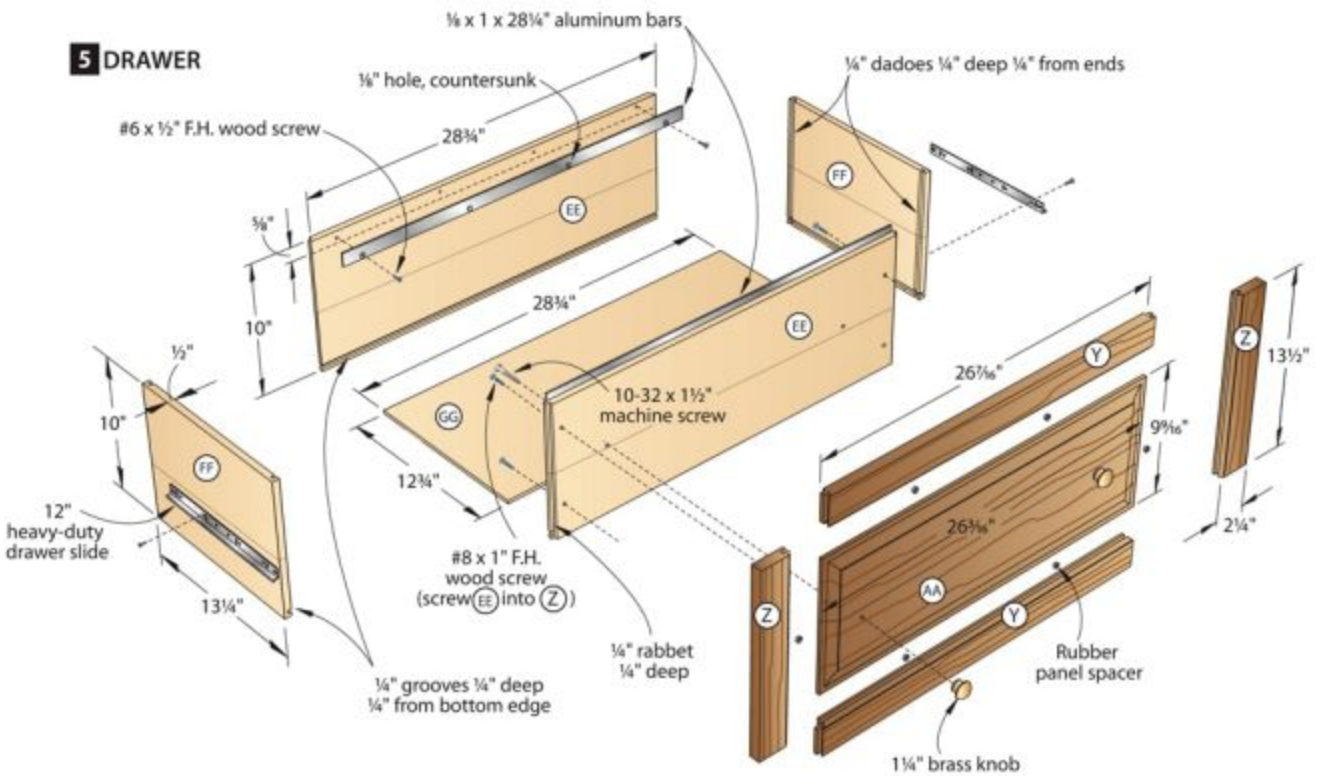


6 Screw the door supports (CC) in the case [**Photo J**]. Slide the door in from the back of the case [**Photo K**], then insert (don't glue) a 1¼"-long dowel in each door support. Mount the knobs [**Drawing 2**]. ***Quick Tip! Make (and see) your mark.*** Put painter's tape on the bottom stiles to make the knob location marks more visible.

Slide the doors in from the back of the case, bottom edge first, so the door passes above the dowel in the door support (CC).

Placing the drawer and front on a spacer and the slide on the bench creates clearance when the drawer is mounted in the carcase.

Using a scrap and the mark on the drawer support (CC) for alignment, screw the drawer slide to the drawer support.

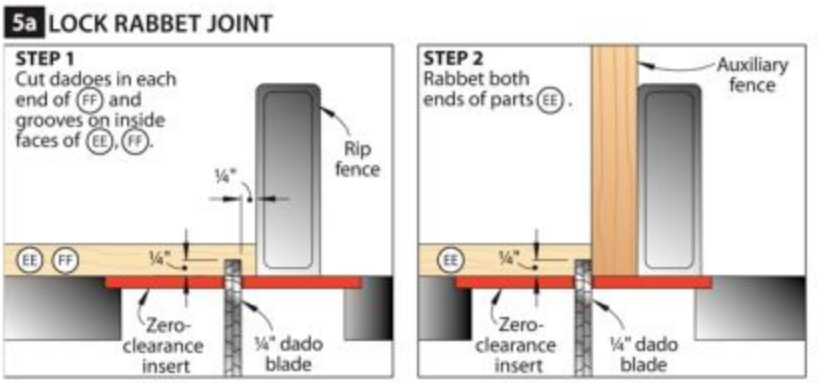


7 Cut the door stops (DD) to size [**Drawing 4a**]. Temporarily attach a rubber bumper to each door stop using double-faced tape. Glue the stops to the shelves (H) so the front of the door rests flush with the front of the shelf edging (I). Reinstall the back (K).

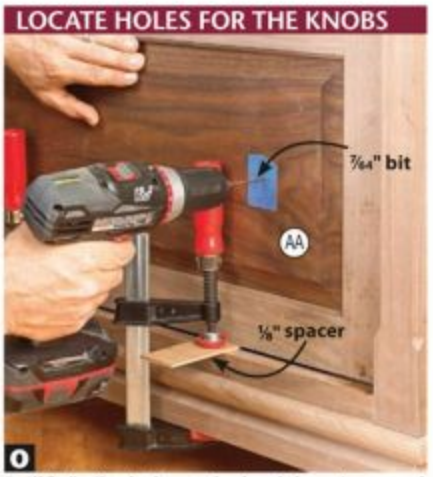
Build and install a drawer

1 Glue up ½" stock for the drawer front/back (EE) and sides (FF). Trim the pieces to size after the glue dries.

2 In your tablesaw, set up a ¼" dado blade and raise it ¼" above the table. With the rip fence ¼" from the blade,



Place ¼" spacers below the drawer supports (CC) to bring them flush with the top face of the bottom trim (J).



Drill 7/64" pilot holes at the knob locations, and temporarily attach the front to the drawer with #8×1¼" flathead wood screws.

Draw layout lines ⅜" from the ends to guide your sanding as you complete the ends of the plinth blocks (HH).

plow a dado across each end of the drawer sides (FF), and a groove to accept the drawer bottom (GG) across the inside faces of the sides and drawer front/back (EE) [**Drawing 5a, Step 1**]. Add an auxiliary fence to the rip fence and rabbet the ends of the front/back (EE) to create a tongue that fits the dadoes in the sides (FF) [**Drawing 5a, Step 2**]. (We demonstrate this process in a free video at woodmagazine.com/simpledrawer.)

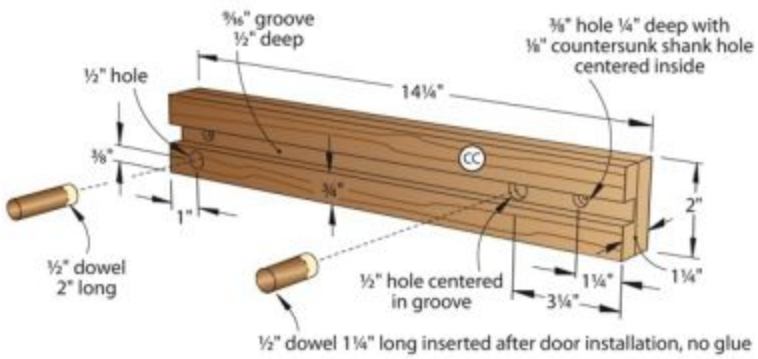
3 Cut the drawer bottom (GG) to size and glue up the drawer, checking for identical diagonal measurements to ensure that the box is square.

4 Rest the drawer (EE–GG) on ¼"-thick spacers and clamp the false front (Y/Z/AA) to the drawer, with the false front also resting on the spacers [**Photo L**]. Place a drawer slide along each drawer side (FF) ⅛" behind the drawer stile (Z) and resting on the bench. Use two screws to secure the slides to the drawer sides. Retrieve the drawer supports (CC) and align them flush with the false front. Transfer the location of the fronts of the drawer slides onto the drawer supports. Remove the slides from the drawer and mount them to the drawer supports [**Photo M**].

5 Remove the drawer slides and mount the drawer supports (CC) in the carcase [**Photo N**]. Then, using the screw holes in the support and drawer sides (FF), remount the drawer slides and install the drawer into the carcase.

6 Lay out the locations of the knobs on the drawer panel (AA) [**Drawing 2**]. (They should align with the door knobs.) Clamp ⅛"-thick spacers to the bottom trim (J) and rest the false front (Y/Z/AA) on them, centered in the opening. Drill pilot holes for #8×1¼" flathead wood screws [**Photo O**]. Drive screws through the drawer panel and into the drawer front (EE). Remove the drawer and false front from the carcase, drill four countersunk pilot holes from inside the drawer into the drawer stiles (Z) [**Drawing 5**], and screw the false front in place. Remove the screws from the knob holes, enlarge the holes to accept #10 machine screws and install the knobs.

6 DOOR SUPPORT
(left side shown, right side mirrored)



Closing arguments

1 Cut a ¾×4×8" blank for the plinth blocks (HH). Rip intersecting 40° bevels along one edge, then rip a ⅜"-wide strip from the beveled edge. Cut the plinth blocks to length from this strip. Sand bevels on the ends to complete the blocks [**Photo P**]. Glue the plinth blocks to the facing (F) [**Drawing 1**].

2 Remove the back (K), doors, and drawer, and remove the false front (Y/Z/AA) from the drawer case (EE–GG). Remove the hardware, including the bumpers, from the door stops (DD). Brush a walnut stain on the carcase top/bottom (G) to blend it in with the carcase. Allow it to dry, then apply a coat of boiled linseed oil to all unfinished pieces. After the oil cures, apply a coat of polyurethane. After the topcoat dries, buff all pieces with 320-grit sandpaper and add a second coat of polyurethane.

3 Have glass cut to size to fit in the doors. Retrieve the glass stop blanks (BB) and miter-cut pieces to fit in the rabbets [**Drawing 4**]. Drill 1/16" holes for the brads, place the glass in the doors, and nail the stops in place. Reinstall the doors and case back (K).

4 To accept hanging file folders, cut two pieces of ⅛×1" aluminum bar to fit between the drawer sides (FF) and drill countersunk ⅛" holes [**Drawing 5**]. Screw the aluminum to the drawer front/back (EE) with ⅜" projecting above the edge of the front and back.

5 Reattach the false front (Y/Z/AA) to the drawer and slide the drawer into the carcase.

6 If there are no objections, stock your case, then hold court to show off its features and your handiwork.

continued on page 36

Materials List

Part		FINISHED SIZE T	W	L	Matl.	Qty.
carcase						
A	panels	¾"	11⅜₁₆"	12¼"	EW	6
B	top/bottom rails	¾"	2"	11⅜₁₆"	W	4
C	center rails	¾"	2¾"	11⅜₁₆"	W	4
D	front stiles	¾"	1½"	44¾"	W	2
E	rear stiles	¾"	2¼"	44¾"	W	2
F	facing	¾"	2"	44⅜"	W	2
G	top/bottom	¾"	14⅛"	33½"	BP	2
H	shelves	¾"	13½"	33½"	WP	2
I	shelf edging	¾"	¾"	33½"	W	2
J	top/bottom trim	¾"	1"	30⅛"	W	2
K	back	¼"	33½"	44¾"	WP	1
top/bottom trim frames						
L*	fronts	¾"	2½"	35½"	W	2
M*	sides	¾"	2½"	15⅞"	W	4
N*	backs	¾"	2½"	30½"	P	2
extension frame						
O*	front	¾"	1¼"	34¼"	W	1
P*	sides	¾"	1¼"	15¼"	W	2
Q*	back	¾"	1¼"	32¾"	P	1
base						
R	front	¾"	3½"	35½"	W	1
S	sides	¾"	3½"	15⅞"	W	2
T	corner cleats	¾"	3½"	3½"	P	6
U	support cleats	¾"	¾"	2¾"	P	4
cap						
V	panel	¾"	15⅜"	35¼"	WP	1
W*	front trim	¾"	¾"	36¾"	W	1
X*	side trim	¾"	¾"	16½"	W	2
door and drawer frames						
Y	rails	¾"	2¼"	26⅞₁₆"	W	6
Z	stiles	¾"	2¼"	13½"	W	6
AA	drawer panel	¾"	9⅜₁₆"	26⅜₁₆"	EW	1
BB	glass stop blanks	¼"	⅜"	38"	W	4
CC	supports	1¼"	2"	14¼"	W	6
DD	door stops	¾"	¾"	¾"	W	4
drawer						
EE	front/back	½"	10"	28¾"	EP	2
FF	sides	½"	10"	13¼"	EP	2
GG	bottom	¼"	12¾"	28¾"	BP	1
HH*	plinth blocks	¾"	⅜"	3"	W	2

*Parts initially cut oversize. See the instructions.

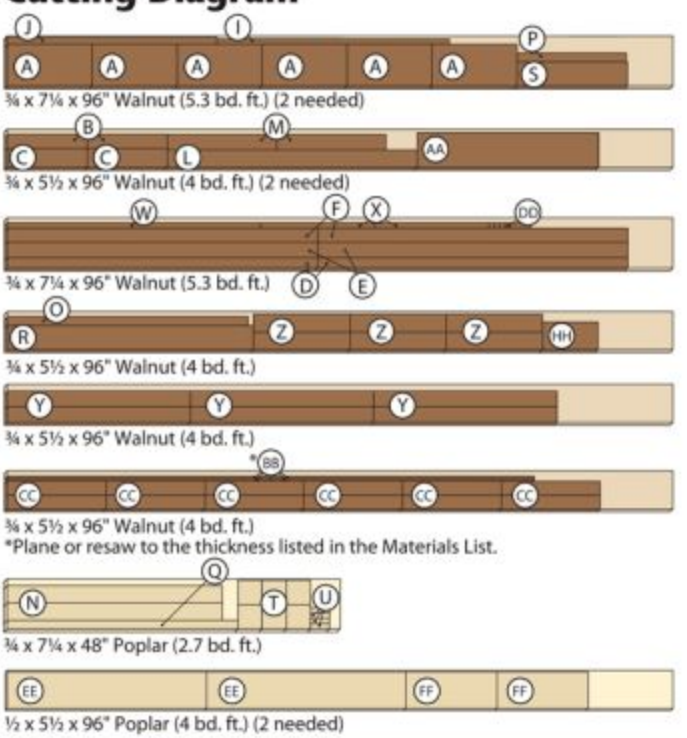
Materials key: EW–edge-glued walnut; W–walnut; BP–birch plywood; WP–walnut plywood; P–poplar; EP–edge-glued poplar.
Supplies: Double-faced tape, #8×1½" flathead wood screws (8), #8×1¼" flathead wood screws (36), #8×1" flathead wood screws (4), #8×¾" flathead wood screws (18), #6×½" flathead wood screws (8), #17×1" brads (24), ⅛×9⅝×26⅝₁₆" single-strength glass (2), ½×12" dowel, ⅛×1×36" aluminum bars (2).
Blade and bits: Dado blade; rail-and-stile set, raised panel with back cutter, ½" round-over, 45° chamfer, ½" cove, and ⅜" rabbeting router bits.

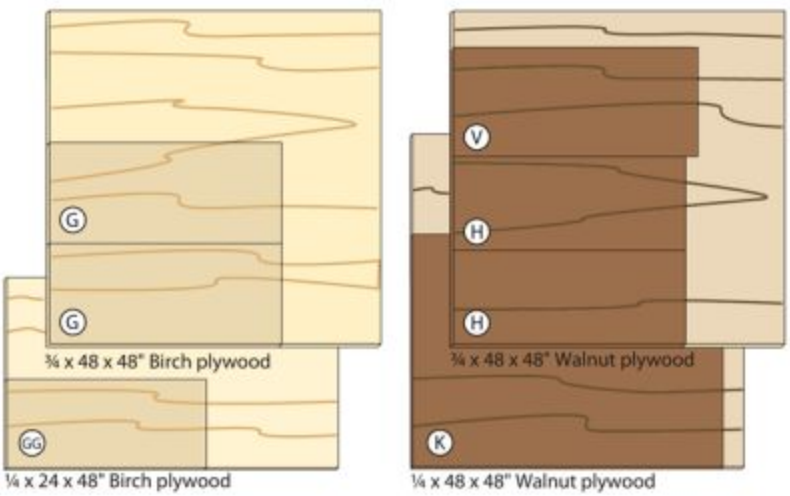
Sources

Hardware: 1¼" brass knobs (6) no. A53012 EB, $1.69; 12" heavy-duty drawer slides (2) no. KV8505 P12, $23.62 [pair]; ½" rubber bumpers (4) no. 3MSJ5312, $5.60 [pack of 56]; rubber panel spacers (42) no. RCR188S, $3.00 [pack of 100]; Woodworker's Hardware, 800-383-0130, wwhardware.com
Router bits: Rail-and-stile set (Freud no 99-260, Woodcraft no. 828792) $99.99; raised panel with back cutter (Freud no. 99-569, Woodcraft no. 828803) $99.99; Woodcraft, 800-225-1153, woodcraft.com

Written by **Craig Ruegsegger** with **Jeff Mertz**
Project design: **Kevin Boyle**
Illustrations: **Roxanne LeMoine**; **Lorna Johnson**

Cutting Diagram


¾ x 7¼ x 96" Walnut (5.3 bd. ft.) (2 needed)
¾ x 5½ x 96" Walnut (4 bd. ft.) (2 needed)
¾ x 7¼ x 96" Walnut (5.3 bd. ft.)
¾ x 5½ x 96" Walnut (4 bd. ft.)
¾ x 5½ x 96" Walnut (4 bd. ft.)
¾ x 5½ x 96" Walnut (4 bd. ft.)
*Plane or resaw to the thickness listed in the Materials List.
¾ x 7¼ x 48" Poplar (2.7 bd. ft.)
½ x 5½ x 96" Poplar (4 bd. ft.) (2 needed)



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- "Making Super-Simple Drawers" at woodmagazine.com/simpledrawer
- "Perfect-Fitting Dadoes" at woodmagazine.com/deadondado

FREE PLAN

- Squaring braces at woodmagazine.com/brace

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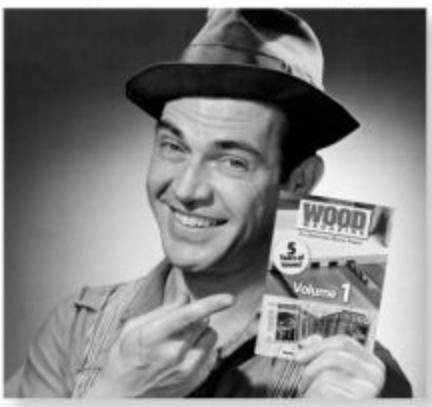

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WD1209

Slim-Profile TV/Game Cabinet

Give your flat-panel television or dartboard a wall-mounted hideaway that's a breeze to build.

WHAT YOU'LL NEED

- **Materials:** ¾" oak, ¼" and ¾" oak plywood, 5/16×¾" oak molding.

PROJECT HIGHLIGHTS

- Overall dimensions: 52¾" wide × 8½" deep × 36¼" high.
- The interior dimensions accept most 42" flat-screen televisions up to 49½" wide × 5½" deep × 32" high.
- Make a half-size version to conceal a standard-size dartboard.
- Build the doors without the expense of cope-and-stick router bits.

As bulky tube-style TVs gradually disappear, so go the old-style armoires and entertainment centers that held them. Today's televisions require smaller, sleeker storage—the kind you can build yourself using basic tools and home-center materials.

In this article, we'll first take you through the steps to build the TV cabinet. Then, on *page 43*, you'll learn about the minor modifications necessary to construct a matching dartboard case.

Assemble the case

1 Cut the top and bottom (A), sides (B), and hanging cleats (C) to size [**Materials List**, *page 42*]. ***Quick Tip! A hang-up without hang-ups.*** To make the hanging cleat fit snugly within the case, cut the cleat with the tablesaw setup used to cut the top and bottom to length.

2 From the outside face, drill and pocket-screw the bottom (A) ½" from the bottom ends of the sides (B) [**Drawing 1**]. Then pocket-screw the top (A) to

Build the cabinet with two or four doors, depending on what's inside. Chalkboard-painted panels inside the dartboard cabinet doors provide a place to keep score.

with the stiles overlapping the sides by ⅛" [**Drawing 1a**, **Photo B**].

6 Cut two 54"-long blanks for the top/bottom front trim (F), a 38"-long blank for the top/bottom end trim (G), one 56"-long blank for the front cap trim (H), and a 22"-long blank for end-cap trim (I). ***Quick Tip! Rout, then cut to size.*** You can machine long parts easier and safer than short ones, so rout profiles on the end trim and end-cap trim before cutting them to length. Rout ½" coves on the top/bottom front trim and top/bottom end trim. Rout ⅜" beads on the front cap and end-cap trim [**Drawing 1a**]. Sand trim parts to 180 grit.

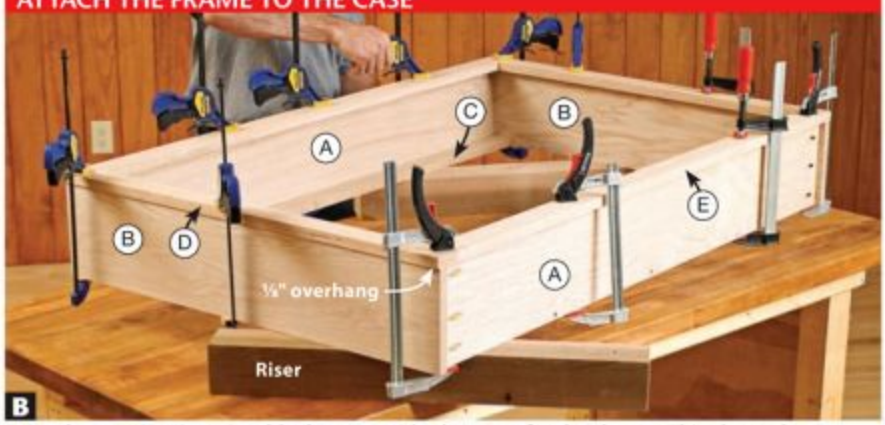
7 Miter the top and bottom front trim (F) to length. Center, drill, and screw the front trim pieces on the case (A–E) with a ¼" front overhang.

8 Cut the top/bottom end trim (G) about 1" oversize and miter one end to make two left and right parts. Mark and cut one top/bottom end trim [**Drawing 1**, **Photo C**]. Then glue and screw it to the case (A–F) [**Photo D**]. Repeat for the other end trim and the front-cap trim (H) and end-cap trim (I).

CLAMP CASE PARTS IN POSITION

Clamps keep the top and bottom (A) from moving while drilling and driving pocket-hole screws into the sides (B).

ATTACH THE FRAME TO THE CASE



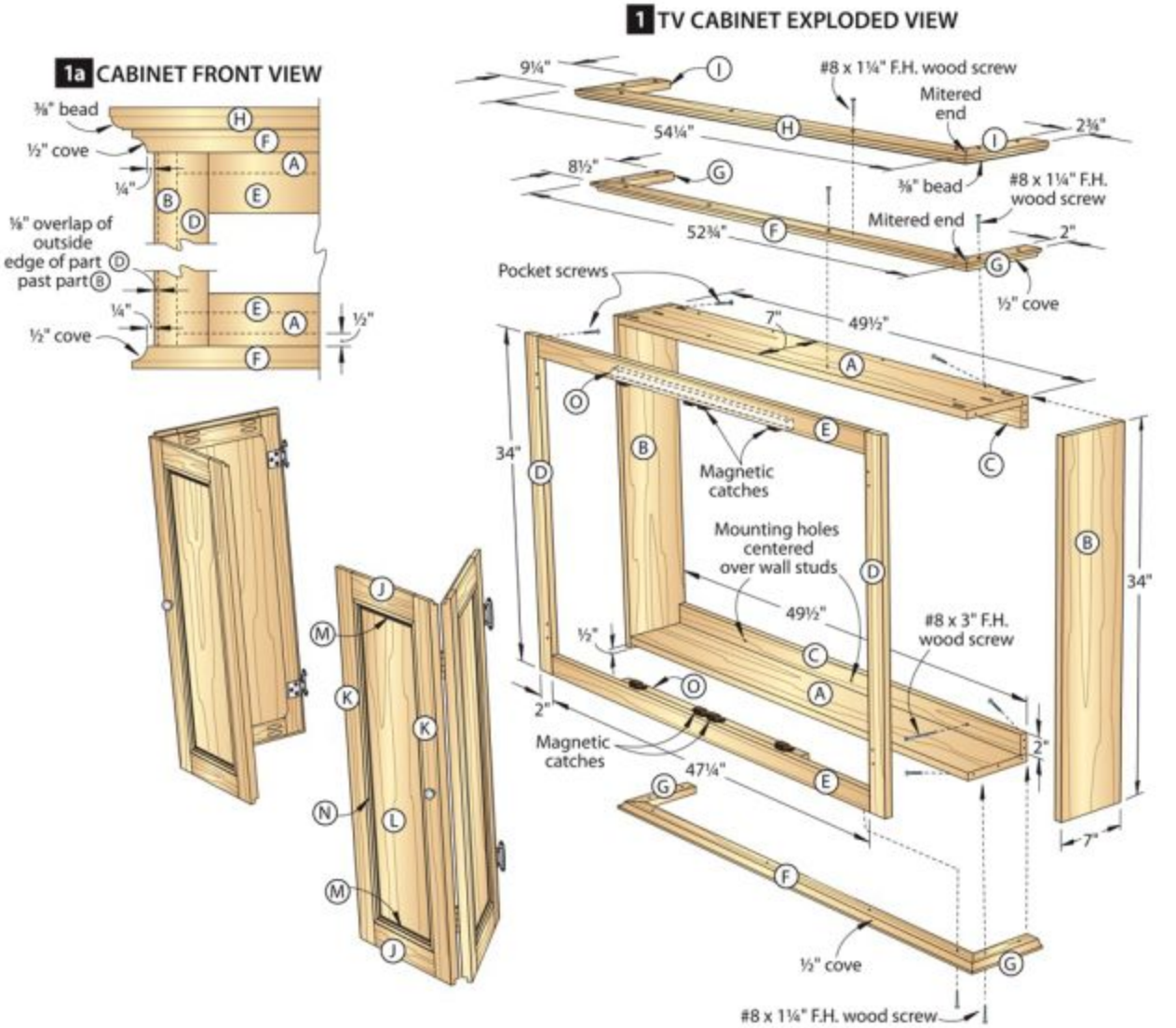
Raise the case (A–E) on riser blocks to provide clearance for the clamps. This also makes it easier to use an assortment of clamps.

the sides, keeping the ends and edges flush [**Photo A**].

3 Screw the cleats (C) to the top and bottom (A) and drive pocket screws from the cleats into the sides (B). (For the #8 screws in this project, drill ⅛" pilot holes.)

4 Cut the face-frame stiles (D) and rails (E) to size. Pocket-screw the rails to the stiles.

5 Glue and clamp the frame (D/E) flush with the top of the case (A/B/C),



Make two pairs of doors

1 Cut the door rails (J) and stiles (K) to size. Attach the rails to the stiles by drilling and driving two pocket-hole screws [**Drawing 2**]. **Note:** *Place pocket-hole screws at least 11/16" from the edges of the rails to keep them clear of rabbets to be routed later* [**Drawing 2a**].

2 Install a ¼" rabbeting bit and make several progressively deeper passes to rout a rabbet ¼" deep around the inside edges of the door frame (J/K).

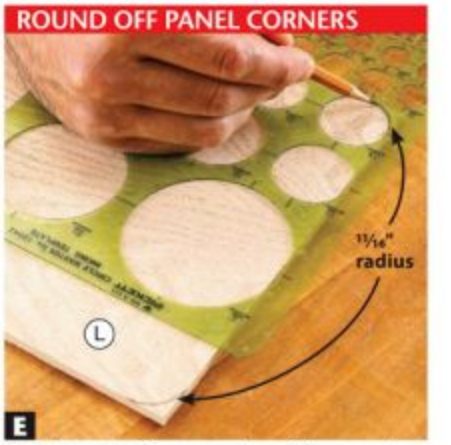
CUT THE TRIM TO LENGTH

C With the top/bottom end trim (G) miter against the front trim (F), mark the end trim at the edge of the top/bottom (A).

ATTACH END TRIM TO THE CASE

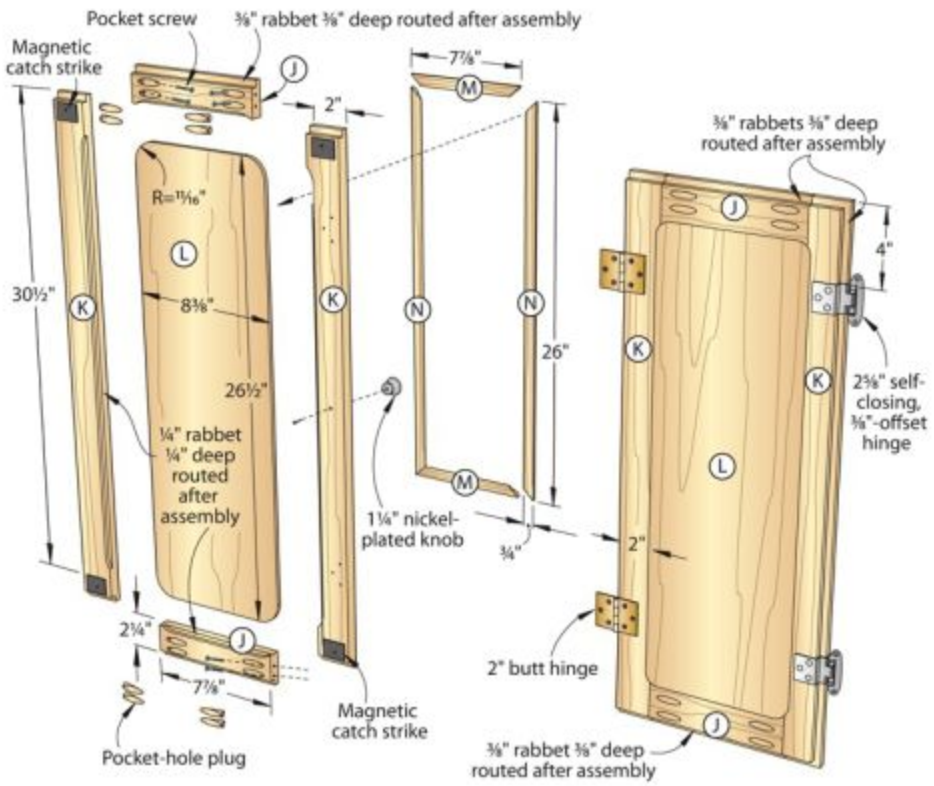
D Drill countersunk ⅛" pilot holes in the top/bottom end trim (G) and pilot holes in the sides (B) before gluing and screwing them.

ROUND OFF PANEL CORNERS

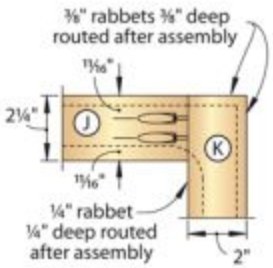


E Use a template from an art or office supply store to mark corner radii on the door panels (L) to match the door-frame (J/K) rabbets.

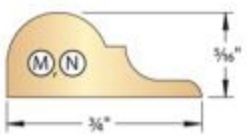
2 DOUBLE-DOOR ASSEMBLY



2a DOOR DETAIL



2b DOOR TRIM PROFILE



3 Cut four door panels (L) to size. Mark an 11⁄16" radius at each corner [**Photo E**] and sand to the lines until they fit between the rabbets [**Photo F**]. Finish-sand the panel faces to 180 grit, then apply a thin bead of glue to the frame rabbet and clamp the panels in place or use two ⅜" brads to secure each panel.

4 After the glue dries, cut the door horizontal trim (M) and vertical trim (N) 1" oversize from molding like that in **Drawing 2b**. (We bought ours at a local home center.) Miter one end of each trim part, then miter each trim part to fit the door frame [**Photo G**]. Glue and clamp the trim in place.

5 Rout ⅜" rabbets on the ends of all doors. On the two doors that will receive hinges, rout an additional rabbet along the door edge that hinges to the frame stiles (D) [**Drawing 2**].

Assemble the cabinet

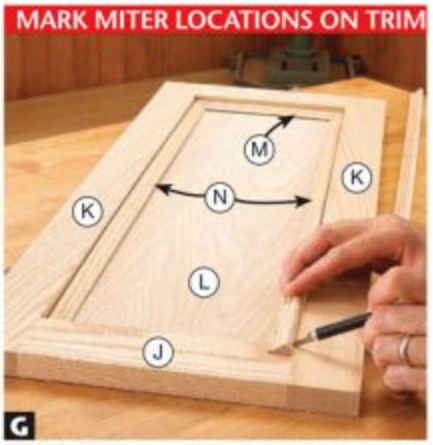
1 Lay one outside door (J–M) side by side with one inside door and space them apart using folded business cards. Center a 2" butt hinge over the gap, then drill and fasten the hinge in place [**Photo H**]. Repeat for the other hinge, and again for the other double door.

2 Drill and screw the ⅜"-offset hinges to the rabbeted door stile (K) of an outside door (J–M). Center the double doors between the frame rails (E). Then drill and screw the hinges to a frame stile (D) [**Photo I**]. Repeat for the other double door. ***Quick Tip! Shrink doors to fit.*** If the two inner doors bump when closed, cut them some slack on

INSERT THE DOOR PANELS

Sanding the panels (L) before they're glued in place eliminates the problem of sanding in tight corners.

MARK MITER LOCATIONS ON TRIM



By scribing the outside edge of the door trim (N) with a crafts knife instead of a pencil, you can miter the end for an exact fit.

MOUNT HINGES TO THE DOORS

Center and screw on the hinges between two doors separated by a folded business card that acts as a spacer.

your tablesaw. Note the amount of door overlap, then remove the hinges from both doors. Adjust your tablesaw to remove half the overlap from the adjoining door stiles. Then reassemble the double doors and recheck the fit.

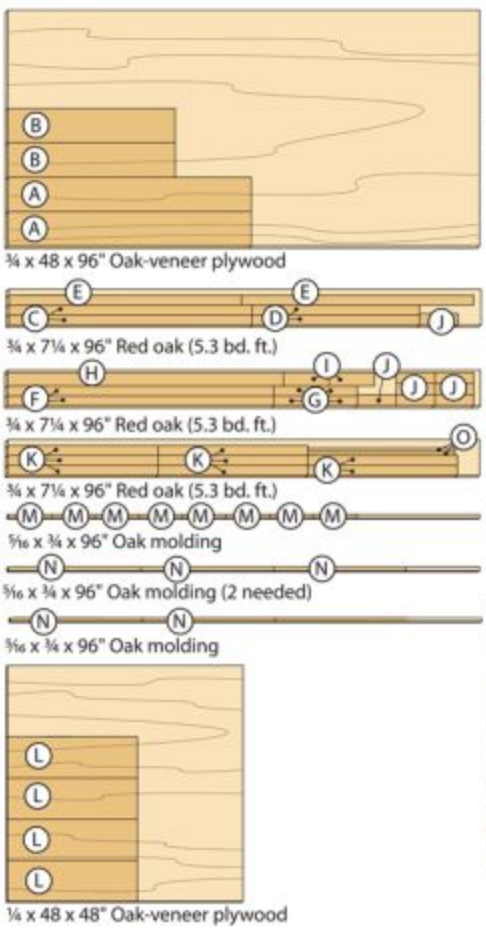
3 Cut the magnet blocks (O) to size; then glue and clamp them to the frame rails (E), centered from side to side and flush with the rail edges [**Drawing 1**]. Drill and screw magnetic catches to the blocks; then drill and screw knobs and strike plates to the doors (J–M).

4 Remove the hardware, fill the pocket holes in the doors with plugs, and sand smooth. Then sand all parts to 180 grit and finish. We applied Varathane no. 209 Golden Pecan stain and two coats of Old Masters water-based finish.

5 Reattach the hardware and mount the cabinet on a wall where you'll hang the television by screwing through the hanging cleats (C) into wall studs. Mount the television using tips in the sidebar *Wire Your TV Like an Expert*, and close the doors on a successful project.

With rabbets on the centered double doors resting on the frame stile (D) and rails (E), drill and drive hinge screws.

Cutting Diagram



Materials List (TV Cabinet)

Part		FINISHED SIZE T	W	L	Matl.	Qty.
Case						
A	top/bottom	¾"	7"	49½"	OP	2
B	sides	¾"	7"	34"	OP	2
C	hanging cleats	¾"	2"	49½"	O	2
D	frame stiles	¾"	2"	34"	O	2
E	frame rails	¾"	2"	47¼"	O	2
F*	top/bottom front trim	¾"	2"	52¾"	O	2
G*	top/bottom end trim	¾"	2"	8½"	O	4
H*	front-cap trim	¾"	2¾"	54¼"	O	1
I*	end-cap trim	¾"	2¾"	9¼"	O	2
Doors (4)						
J	rails	¾"	2¼"	7⅞"	O	8
K	stiles	¾"	2"	30½"	O	8
L	panels	¼"	8⅛"	26½"	OP	4
M*	horizontal trim	5/16"	¾"	7⅞"	O	8
N*	vertical trim	5/16"	¾"	26"	O	8
O	magnet blocks	¾"	¾"	30"	O	2

*Parts initially cut oversize. See the instructions.

Sources

Materials key: OP–oak-veneer plywood, O–red oak.
Supplies: Pocket screws, #8×1¼" flathead wood screws, #8×3" flathead wood screws, knobs (2), 2" butt hinges (4), ⅜"-offset hinges (4), magnetic catches (8), pocket-hole plugs, 1¼" nickel-plated knobs (2).
Bits: ¼" rabbeting bit, ⅜" rabbeting bit, ⅜" round-over bit, ½" cove bit, pocket-hole drill bit and jig.

Wire Your TV Like an Expert

Before you mount your television cabinet, plan how you'll wire it for electricity, antenna, cable, speakers, and add-ons such as a DVD player. This can be as simple as installing a wiring chase from the TV cabinet to the baseboard or as sophisticated as running in-wall wiring.

For help with this, we turned to the online Learning Center at Crutchfield, a mail-order and retail electronics specialist. Learning Center topics include everything from audio/video basics to installing home-theater systems. To get you started, we worked with Crutchfield to bring you these Learning Center tutorials:

- **Tips and Techniques for Home A/V Cable Management** covers how to conceal wires behind raceway channels without in-wall wiring. Visit woodmagazine.com/cables
- **A Guide to Wall-Mounting Your Flat-Panel TV** explains in detail how to safely attach a flat-panel television to the wall behind your new cabinet. Visit woodmagazine.com/flatpanel
- **In-Wall Wiring Guide** explains how to run wires and cables within walls. Visit woodmagazine.com/inwallwiring
- **TV Connections** helps you make sense of ports on the back of today's televisions and describes which types of cables give you the highest quality picture and sound. Visit woodmagazine.com/connect
- To explore topics ranging from how to shop for a high-definition TV to creating a home theater, visit the Crutchfield Learning Center at crutchfield.com

Build a dartboard cabinet that scores a bull's-eye

Make an open-back dartboard cabinet using most of the same techniques and parts as the television cabinet.

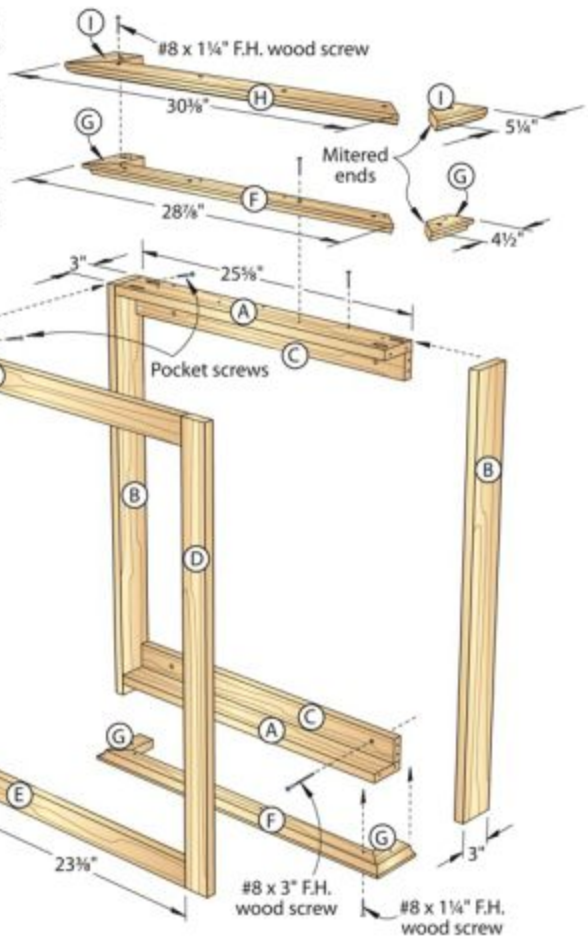
1 Cut the parts to size where noted [**Materials List**], as with the television cabinet. Note that you'll make only two single doors this time and no magnet block [**Drawing 3**]. Instead, you'll add two chalkboard panels (P).

2 Assemble the cabinet (A/B/C) and frame (D/E) as before. Attach the front and end trim (F, G) to the top and bottom, followed by the front and end-cap trim (H, I).

3 Make two single doors (J–N) like the outside doors on the TV cabinet. Cut the chalkboard panels (P) to size and cover the front face with two coats of chalkboard paint [**Sources**]. Then center, glue, and clamp a chalkboard panel to the inside panel of each door.

4 Mount hinges on the doors and fasten them to the stiles (D). Sand where needed up to 180 grit and finish as desired. Hang a dartboard with its bull's-eye the regulation 5'8" above the floor and center the cabinet over the dartboard. Screw it through the hanging cleats (C) and into the wall studs.

3 DARTBOARD CABINET EXPLODED VIEW

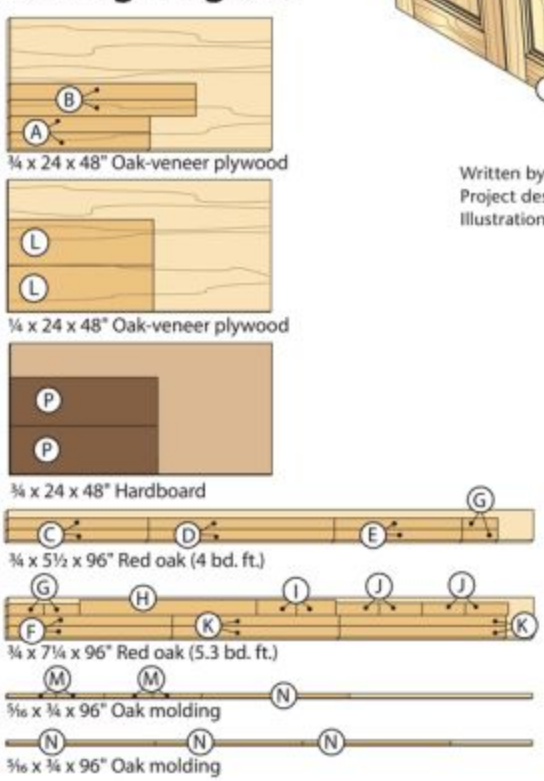


MORE RESOURCES

RELATED VIDEO

■ "Digital TV Antennas and Installation" at woodmagazine.com/DigitalTV. $ ($=Download this video for a small fee.)

Cutting Diagram


¾ x 24 x 48" Oak-veneer plywood
¼ x 24 x 48" Oak-veneer plywood
¾ x 24 x 48" Hardboard
¾ x 5½ x 96" Red oak (4 bd. ft.)
¾ x 7¼ x 96" Red oak (5.3 bd. ft.)
5/16 x ¾ x 96" Oak molding
5/16 x ¾ x 96" Oak molding

Written by **Bob Wilson** with **Kevin Boyle**
Project design: **Jeff Mertz**
Illustrations: **Roxanne LeMoine**; **Lorna Johnson**

Sources

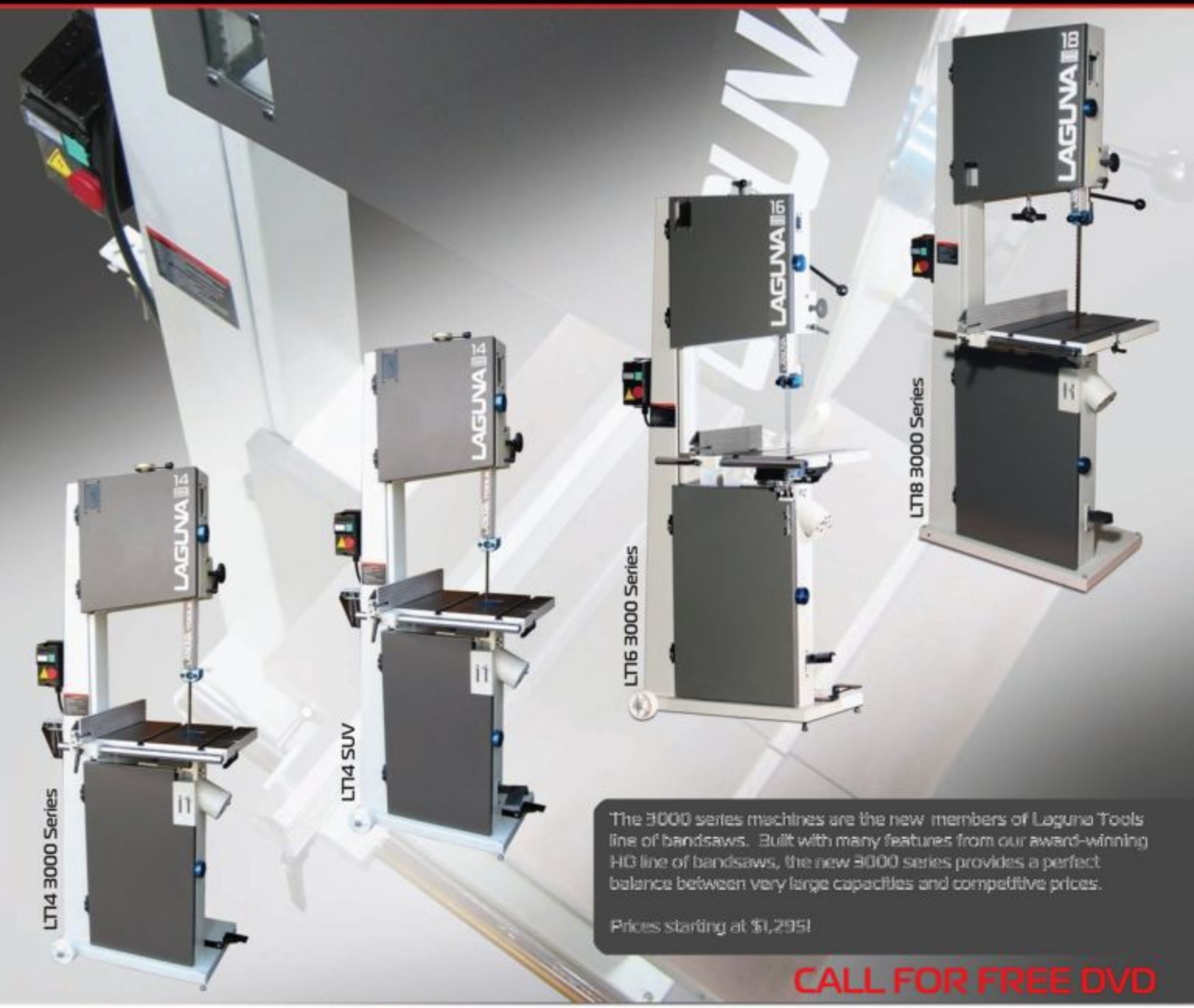
Materials key: OP–oak-veneer plywood, O–red oak, HB–hardboard.
Supplies: Pocket screws, #8×1¼" flathead wood screws, #8×3" flathead wood screws, knobs (2), ⅜"-offset hinges (4), pocket-hole plugs, 1¼" nickel-plated knobs.
Bits: ¼" rabbeting bit, ⅜" rabbeting bit, ⅛" round-over bit, ½" cove bit, pocket-hole drill bit and jig.
Sources: Blackboard paint no. 203261, $12 per quart, available at Lowe's stores. Or use Rust-Oleum no. 206540 chalkboard paint, $15 for 30 oz., from Amazon.com.

Materials List (Dartboard Cabinet)

Part		FINISHED SIZE T	W	L	Matl.	Qty.
Case						
A	top/bottom	¾"	3"	25⅝"	OP	2
B	sides	¾"	3"	34"	OP	2
C	hanging cleats	¾"	2"	25⅝"	O	2
D	frame stiles	¾"	2"	34"	O	2
E	frame rails	¾"	2"	23⅜"	O	2
F*	top/bottom front trim	¾"	2"	28⅛"	O	2
G*	top/bottom end trim	¾"	2"	4½"	O	4
H*	front cap trim	¾"	2¾"	30⅜"	O	1
I*	end cap trim	¾"	2¾"	5¼"	O	2
Doors (2)						
J	rails	¾"	2¼"	7⅞"	O	4
K	stiles	¾"	2"	30½"	O	4
L	panels	¼"	8⅜"	26½"	OP	2
M*	horizontal trim	5/16"	¾"	7⅞"	O	4
N*	vertical trim	5/16"	¾"	26"	O	4
P	chalkboard panels	¼"	8⅜"	27"	HB	2

*Parts initially cut oversize. See the instructions.

AWARD-WINNING DESIGN



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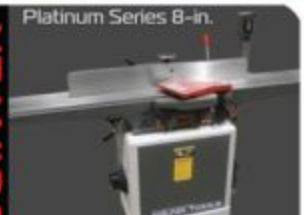

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1/8-in. Cut Capacity
Shear-Tec Spiral Cutterhead

PLANER

Platinum Series 20-in.

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2009 WOOD® INDEX Issues 188 thru 194

For quick tips on using this index, see *page 48.*

188

189

190

191

192

193

194

PROJECTS

Air compressor caddy, 190:52-55
Bedroom set, Shaker-style, 187:24-39
Benchtop risers, 193:24, 26
Blanket chest, 194:30-36
Bookcase, glass-door, 191:34-40
Bud vase, 194:28-29
Cabinets, basic, 191:50-55
Candleholder, 191:20-21
Circular saw cutting guide, 191:26
Clamp racks:
- Adjustable, 191:56-58
- Hold by handles, 194:18
- Shelf-style, 193:75

Clock, mantel, 194:54-56
Cope-cutting sled, 191:32
Desk, drop-front, 193:32-38
Dowel drilling jig, 189:72
Dresser, Shaker-style, 188:34-40
Dust collection floor chute, 188:10
Excavator, toy, 194:62-65
Ice cream scoop, turned-handle, 191:76-78
Jewelry chest, 191:70-75
Lingerie chest, Shaker-style, 189:34-40
Magazine file, 193:66-68
Mirror, Shaker-style, 188:66-68
Music box, 192:47-51
Napkin holder, 189:20
Organizer, wall-hung, 189:49-53
Picnic table, 191:60-65
Printer stand, 192:66-69
Quilt ladder, update, 189:6
Rocking horse, 193:50-53
Router table, 192:56-61
Saddle jig, for cutting tall pieces on tablesaw, 192:70
Sanding-disc caddy, 189:32
Sandpaper cutter, 190:85
Shelf and towel rack, 192:34-37
Shelf-pin drilling jig, 191:24
Shelves, stacking, 189:70-74
Table, Arts & Crafts, Limbert, 192:30-33
Table set: coffee, end, sofa, 188:54-60
Table-leg trimming jig, 189:30
Tapering jig, 188:12
Telephone stand, 190:62-65
Tool tote, toy, 190:76-77
Towel rack and wall shelf, 192:34-37
Tree bench, 190:38-44
Valet, dresser-top, Shaker-style, 188:41-43
Wine rack, 188:62-64
Work table, folding, 190:32
Workbench, 194:42-44

TOOLS & MATERIALS

Air-filtration system, Powermatic, test, 192:77
Bandsaw, adjustable height, General International, 188:30
Bandsaw, Steel City, test, 189:16
Bandsaw, update, cutting steel, 188:8
Bandsaw blade, how to coil, 191:18-19
Bandsaw blade oscillation, 193:84
Basic power tools, best, 190:34-37
Circular saws: Makita, Skil, 190:34
Circular saws, rail-guided, test, 192:62-65
Clamps, parallel-jaw, Bessey, 188:30
Clamps, parallel-jaw, Irwin, test, 194:74
Contour sanders, Style-Line Corp., test, 194:76
Coping sleds for router table, test, 191:30
Dado sets, test, 188:50-53
Doweling joiner, Freud, 188:29
Drill/drivers: Hitachi, Makita, 190:36
Drill/drivers: Ridgid, Ryobi, 188:30
Drum sander, oscillating, Jet, 188:30; test, 193:78
Drum sanders, test, 190:49-51
Dust collector, portable cyclone, Oneida, test, 190:82
Dust collectors, portable cyclone: JDS, Oneida, 188:32
Forstner bit sets, test, 194:20
Gator Micro Zip Sander, Ali Industries, test, 193:80
Glues, best for outdoor, test, 190:72
Granite-enhanced machines, 189:16
Hinge-boring Jig, Sommerfeld, test, 191:80
Innovations of the past 25 years, 193:58-62
Jigsaw blades, Bosch, 188:32
Jigsaw blades, Starrett, test, 192:78
Jigsaws: Black & Decker, Bosch, 190:37
Jointer, Steel City, test, 189:16
Jointer knives, Dispozablade, test, 193:82
Jointer/planer combos, test, 191:66-68
Jointers, test, 189:54-59
Lathe, Laguna Tools, test, 194:72
Magswitch, 188:32
Mitersaw, dual compound/sliding, Milwaukee, 188:30
Mitersaw, dual-bevel, Milwaukee, test, 193:80
Mitersaw, sliding compound, Bosch, test, 191:80
MiterSet, Richard L. Pattee, test, 191:83
Mortise Mill, JessEm, 188:32
Nailer/compressor combo kits, test, 190:30
Nail-puller, Extractor, test, 189:19
Outlet, rotating, 360Electrical, test, 190:84
Painter's Pyramids, test, 192:77
Planer/jointer combos, test, 191:66-68
Random-orbit sander, Milwaukee, 190:37
Right-angle assembly squares, test, 193:22
Router bit, Double-grind straight, Freud, test, 191:81
Router bit, tambour door set, Amana, test, 194:73
Router-bit setup tips, 194:50-53
Router dado jig, Infinity Cutting Tools, test, 194:76
Router mortising jig, Mortise Pal, test, 190:82
Router table accessories, test, 192:24:
- Featherboard, Milescraft
- Fence, Woodpeckers
- Safety switch, Rockler
- T-track/miter track, MLCS

Router-table power switches, test, 189:28
Routers: Bosch, Craftsman, 190:36
Routers for table mounting, 192:26

continued on page 46

TOOLS & MATERIALS (CONT.)

Article, Issue: Page

Setup tools for machinery, 189:22, 24
Tablesaw, Craftsman, 190:35
Tablesaw, Delta Unisaw, 188:29; test, 192:76
Tablesaw, Grizzly, 190:35
Tablesaw, hybrid, Ridgid, test, 194:72
Tablesaw, SawStop, test, 191:80
Tablesaw, splitter vs. riving knife, 188:74, 192:6
Tablesaw blade, damaged, 194:78
Tablesaw blades less than $50, test, 194:58-60
Tenon-Lok joinery system, Rockler, test, 193:78
Tenoning jigs, test, 193:69-71
Tools for fine-tuning joints, 194:24, 26
WorkSharp, update, 189:6

TECHNIQUES AND FEATURES

Article, Issue: Page

Abbreviations on Internet, 189:78
Abram, Norm, 192:38-42
Acrylic, cutting, 189:78
Baseboards and chair rails, making and installing, 194:66-70
Bevel large tabletops, 191:17
Beveled tapers, 192:22-23
Biscuit joint mistakes, 193:28, 30
Cabinet door, making and mounting, 191:53-54
Cabinetmaking basics, 191:50-55
Casters, on picnic table, 188:78
Chair rails and baseboards, making and installing, 194:66-70
Chatoyance, defined, 189:80
Consumer Product Safety Improvement Act, 191:14
Coping molding, 194:69
Dadoes, cutting on tablesaw, 188:16
Deadblow mallet, using, 190:78
Digital subscription, 190:6
Door and window trim, make and install, 193:40-44
Door contest winner, 191:12
Dovetailing wide panels, 194:38-39
Dowels, making, 194:81
Drawer, making, 191:54-55
Drawer, out of square, 194:22
Earlywood and latewood, defined, 193:83
Finishing:
- Film finish, fixes, 190:18-19, 21
- Lacquer, repair damage, 188:81
- Pine, staining, 189:81
- Shellac, all about, 192:18, 20
- Staining plywood, to match solid stock, 188:14
- Walnut, faux, 189:74

Frame and panel construction, 190:56-60
Furniture labeling, 192:74
Gloves for solvents, 190:81
Glue-up, no clamps, 188:78
Going pro, 188:70-73
Habits for shop success, 190:66-69
Hand tools, problem solving:
- Bench chisels, 192:54
- Block plane, 192:55
- Card scraper, 192:55
- Flush-trim/dovetail saw, 192:55
- Sanding grips, 192:55

Index, issues 181 thru 187, 188:6, 45-48
Joinery:
- Bevel joints, how to, 190:22
- Beveled tapers, 192:22-23
- Biscuit joint mistakes, 193:28, 30
- Dadoes, how-to, 188:16
- Dovetailing wide panels, 194:38-39
- Dovetails, how-to tips, 188:24, 26-27
- In large parts, with circular saw, 191:26-28
- Metal fasteners, or not?, 193:18
- Mortise-and-tenon, hints, 188:63; sizing 189:76
- Outdoor adhesives, joint test, 190:72-74
- Pocket-hole, 188:57; face frame, 191:52-53
- Tools and methods for fune-tuning, 194:24, 26

Jointer, save money with, 194:40-41
Jointing and planing, how to, 189:60-63
Knots, working with, 190:28; 194:6
Lamination springback, 192:73
Lighting, shop, placement, 194:80
Metal, hidden inside trees, 191:14
Moisture content, 189:83
Norm Abram, 192:38-42
Planer, save money with, 194:40-41
Presidential gifts, 189:86
Pressure-treated lumber, safety, 189:82
Raised-panel door, how to, 190:24-26
Raised panels, movement, 194:82
Router burn marks, remove, 191:22; 194:13
Router-bit setup tips, 194:50-53
Routing small parts, 190:78
Salvaged lumber, finding and using, 193:72-74
Scrapers and parting tools, how to use, 189:42-44
Screw, removing broken, 194:78
Screws, choosing, 191:41-43
Securing the shop, 192:72
Shellac, 192:18, 20
Shop Monkey, metal vs. wood fasteners, 193:18
SketchUp, design tips, 189:64-68
Smoke smell, removing from furniture, 192:75
Spalted maple food safety, 191:16
Splitter/riving knife, 188:74; 192:6
Staining, matching plywood and solid stock, 188:14
Story stick, 190:70-71
T-track, installing, 188:83
Table legs, fixing uneven, 189:30
Templates preserving, 189:76
Trim, make quarter round, 190:78
Turning, Doug Magrath, 188:70-73
Turning: How to use scrapers and parting tools, 189:42-44
Underwriters Laboratories, 190:79
Veneering made easy, 193:54-56
Video sources, 190:6
Window and door trim, build and install, 193:40-44
Wood grain selection, 192:72
WOOD magazine's first 25 years, 193:64-65
Wood toy regulations, 191:14
Woodworking woods:
- Bamboo, 192:53
- Cedar, aromatic, 194:16
- Combination-core plywood, 192:52
- Cypress, 194:6
- Earlywood and latewood, defined, 193:83
- Ipe, 192:53
- Lyptus, 192:52
- MDF, differences in quality, 189:80
- Padauk, 190:80
- Pine, pitch bleeding, 190:81
- Pressure-treated lumber, safety, 189:82
- Spalted maple, 191:16
- Wood grain selection, 192:72
- Wood substitutes, 192:52-53

Card scraper, 192:55

Habits for shop success, 190:66-69

Scrapers and parting tools, 189:42-44

SHOP TIPS/SKILL BUILDERS

Article, Issue: Page

Bandsaw blade labeling, 194:8
Bandsaw quick-release fence, 193:15
Bandsawing small parts, 193:83
Baseboard moldings, miterless corners, 194:68
Bending steel, 190:42
Bookmatching:
  Solid stock, 191:72
  Veneer, 193:55
Brass, working with, 191:74
Burn marks, removing, 194:13
Carriage bolt, prevent slipping, 192:10
Carriage bolts, square-hole washers, 191:62
Centerline on tapered legs, 189:10
Chalk, keep from breaking, 194:15
Chamfer on drawer, 192:69
Chisel holder, magnetic, 190:16
Circular saw, zero-clearance plate, 188:21
Clamp without a vise, 192:32
Clamping curved parts, 188:63
Clamping deep, using metalworking clamps, 188:20
Clamping flat for gluing, 188:68
Clamps, pins through handles for leverage, 192:17
Corner brace, 190:64
Curved leg, cutting on tablesaw, 190:65
Dado blade, resharpen, 188:51
Dado width adjustment, 191:9
Detail-sander storage, 190:17
Dovetail, patching pin, 194:34
Dovetail angle ratio, 194:31
Dovetail saws, 194:33
Dowel center-finder, 192:16
Dowels and dowel holes, align, 189:72
Downdraft sanding on tablesaw, 191:6
Drill press, ratcheting handle, 192:17
Drill press keyless chuck, 192:14
Drill-press crank extension, 188:18
Drill-press table realignment, 189:11
Drilling extra-deep holes, 193:83

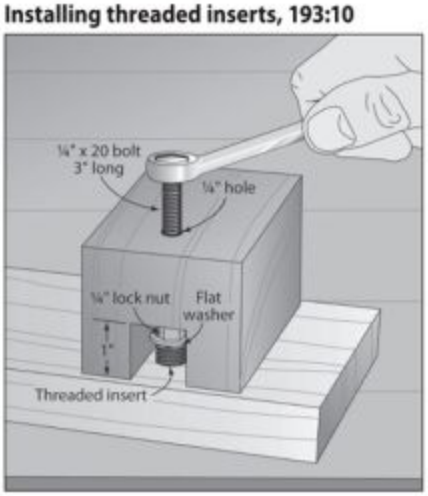
Article, Issue: Page

Drum sander adapter, 194:10
Duplicating parts, 193:52
Dust collector, hand-held router, 189: 8
Dye, faux walnut, 189:74
Featherboards, 193:14
Finish, vacuum pump air out of cans, 189:15
Finishing table, 191:6
Fluting jig for router, 192:8
Gauging cuts, turning, 191:77
Glue, drive screws after, 189:52
Glue brush and magnet, 194:11
Glue joint, soften glue with heat, 190:17
Glue squeeze-out, avoid, 188:35
Grooves, centered, 189:72
Half-lap, setup, 191:38
Hand plane, protect sole, 194:13
Hinge mortise template for routers, 192:50; 193:34
Hinge mortises, routing, 189:14; 192:6
Jigsaw blade for cleanest cutting, 192:35; 193:51
Kerfs with flat bottoms, 192:49
Laminate plans to preserve, 189:11
Lathe shavings control, 190:15
Lumber, dimensional, working with, 191:61
Marking machined stock, 189:62
Measurement error by multiplication, 189:12
Miter sled for picture frames, 194:8
Mitered corners clamp, 188:23
Mitersaw hold-down clamp, 190:14
Mitersaw safety, cutting small pieces, 191:9
Mortise-and-tenon hints, 188:63
Nail blowout, avoiding, 191:11
Nail removal, 194:67
Organizer hangs on back of door, 188:21
Paint-roller saver, 188:23
Panel clamps, 191:10
Patterns, self-adhesive, 191:8
Permanent marker on bit cases, 189:12
Plywood thickness, 189:37

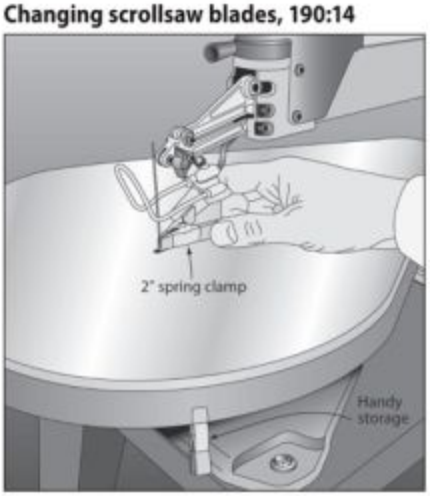
Article, Issue: Page

Pocket-hole joinery, 188:57
Precision without a ruler, 189:51
Pushstick for belt sander, 188:18
Rabbets, cutting on tablesaw, 188:57
Rabbets, using table-mounted router, 188:67
Rabbets with handheld router, 192:36
Rag-box holder, 193:12
Raised-panel squeeze-out, 193:13
Redrilling large holes, 193:13
Repeat tasks, spacers and guides, 190:39
Rip thin strips, 189:71; 194:12
Rout small parts safely, 191:21
Sander, pushstick holder, 188:18
Sanding thin pieces, 191:8
Sawhorse lifts sheet goods, 189:13
Screw organizer, 192:10
Scrollsaw blade keeper, 188:20
Scrollsaw, changing blades, 190:14
Setup gauge, tablesaw, 190:71
Shelving as door on shop shelves, 194:11
Shop tip organization, 193:12
Splines provide support, 190:16
Storage using jack posts, 192:12
Story stick, 188:41; 189:10
Stub tenons, sizing, 188:37
Tablesaw fence, mircoadjuster, 190:12
Tablesaw hold down, 194:15
Tablesaw sawdust solution, 190:15
Tablesaw sleds:
  For odd-shaped pieces: 193:17
  With replaceable inserts, 192:15
Templates from plastic cutting boards, 193:10
Threaded inserts, installing, 193:10
Threaded rod, cutting, 194:63
Trimming overhang edges, 189:36
Voids, patching with epoxy, 194:44
Zero-clearance plate, for circular saw, 188:21

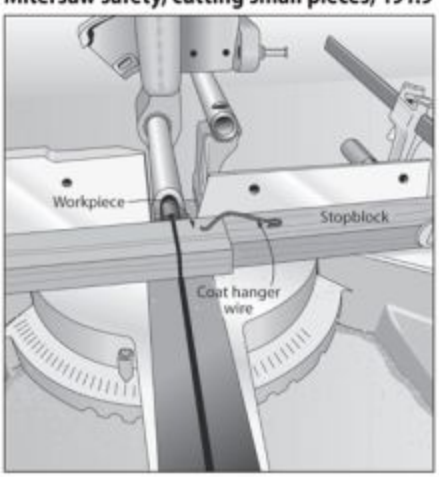
Installing threaded inserts, 193:10



Changing scrollsaw blades, 190:14



Mitersaw safety, cutting small pieces, 191:9



HOW TO USE THIS INDEX

This annual index includes every article and Shop Tip that appeared in *WOOD*® magazine from the December/January 2008/2009 issue through the November 2009 issue. To quickly find the article you're looking for, first identify the major index category most likely to contain the article:

- Projects (plans with step-by-step instructions)
- Tools & Materials (product reviews and guidance on using tools, accessories, hardware, and wood products)
- Techniques and Features (specific skills and articles of general interest, such as craftsman profiles)
- Shop Tips/Skill Builders (quick ideas you can put to use in your shop today)

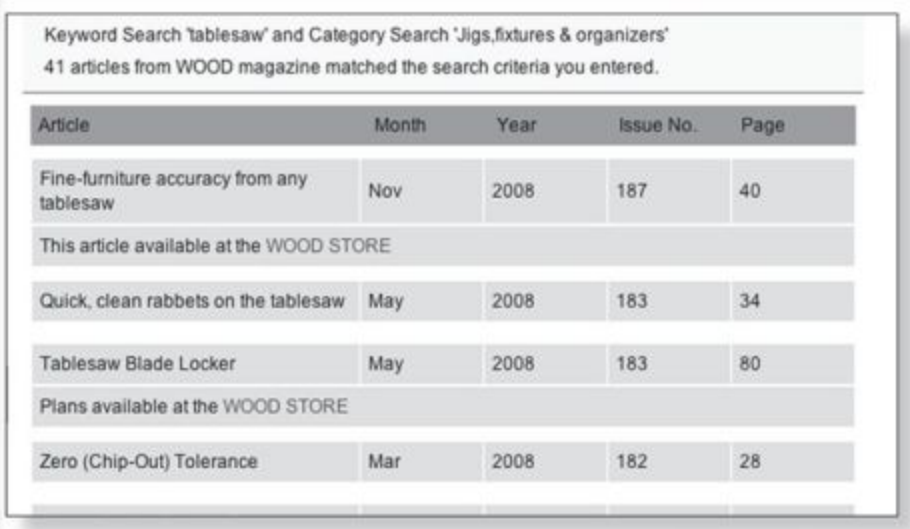
Then look for the one word that best describes the project, technique, tool, or shop tip. Articles with two strong descriptors, such as a mission table, may be found under both descriptors—"mission" and "table."

Three steps to find any article, from issue 1 to present, using the online index

1 You also can quickly search the comprehensive online index of all *WOOD* magazine articles in one of two ways. First, to get directly to the index, type **woodmagazine.com/index** in your Web browser. Or, click on the **Article Index** button, shown *below*, in the left column of any **woodmagazine.com** page.

2 In the Keyword Search box, type the *one word* that best describes the article subject, avoiding plurals. For example, to locate a tablesaw review, type "*tablesaw*," (or simply "*table*") but not "*review*." Click on the button marked **Search**. If you want to narrow the search to tablesaw jigs, type "*tablesaw*" in the box, then click on the button next to the words: **Jigs, Fixtures, & Organizers** under Category Search. Next, scroll down and click on **Search** under Keyword and Category Search.

3 The Web page now displays a list of articles related to your search term, including the cover date of the issue, issue number, and the page numbers. If you don't have the issue, most articles published in *WOOD* magazine can be downloaded for a minimal cost. This list indicates downloadable articles with the blue words **WOOD STORE**, which, when clicked on, give you more details about buying the article. Otherwise, some back issues are available for $7.95 (plus s&h) by calling 888-636-4478.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This article available at the WOOD STORE
Quick, clean rabbets on the tablesaw | May | 2008 | 183 | 34
Tablesaw Blade Locker | May | 2008 | 183 | 80
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Zero (Chip-Out) Tolerance | Mar | 2008 | 182 | 28

Not sure exactly what project plan you're looking for? Go window shopping!

So, you've had a request from a family member to build a project—say, a piece of mission-style furniture. Where do you start? Go to the *WOOD* Store® at woodstore.net and click on the tab that best describes the article you want (**Plans**, **Techniques and Features**, or **Tool Reviews**). Staying with the mission furniture example, you next click on **Projects**, and on the next page **Indoor Furniture and Accessories**, and then **Arts and Crafts Furniture**, **Mission Style** on the next page. There, you'll find more than 30 mission-style projects.

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Passing the snacks at your next party might be a problem as guests pause to admire the contrasting woods and flowing lines of this chip and dip holder. When guests ask for snack trays of their own, make copies in no time using templates.

Assemble a tray blank

1 Starting with stock about ¼" thicker than shown in the **Materials List**, *page 52*, edge-glue three panels to create blanks for the tray top and bottom (A) and middle (B). After the glue dries, plane the blanks to thickness.

2 To distribute clamping pressure to the center of your lamination, cut six 2×12" clamping cauls and lay out a curve on one edge of each with the center of the faces ⅛" wider than the ends [**Drawing 1**]. Cut or sand each caul to the layout line.

3 Stand three pairs of clamps on your bench with cauls spanning the lower jaws, curved edge up [**Photo A**]. Glue and sandwich the tray middle (B) between the tray top and bottom (A) with the ends and edges flush. Place the remaining cauls curved side down on top of the tray parts between the pairs of upper clamp jaws. Tighten the clamps until the ends of the cauls touch the blank.

Templates for success

1 Cut two ½×11×17" pieces of MDF or Baltic birch plywood for the templates. Enlarge the tray pattern [**Drawing 2**] 400 percent to make two full-size photocopies. Or if you prefer to trace the layout on the template blanks, first make a beam compass using ½" MDF or plywood [**Drawing 3**].

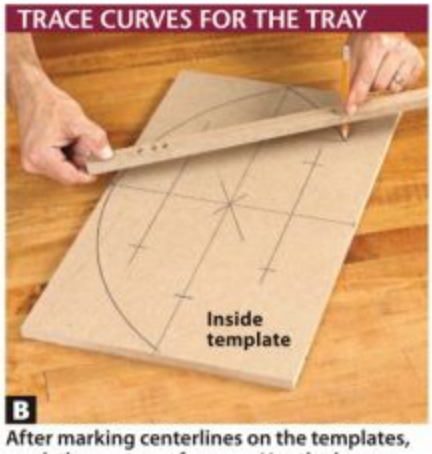
2 Lay out centerlines on each template and mark each radius where shown [**Drawing 2**]. Use the beam compass to trace arcs [**Photo B**]. Label one template as "inside" and the other as "outside."

3 On the inside template, cut out the openings about 1/16" from the lines

LAMINATE THE TRAY PANELS

Cauls evenly distribute clamping pressure from the edges to the center of the glue-up. Arrows on the cauls mark the curved edges.

TRACE CURVES FOR THE TRAY

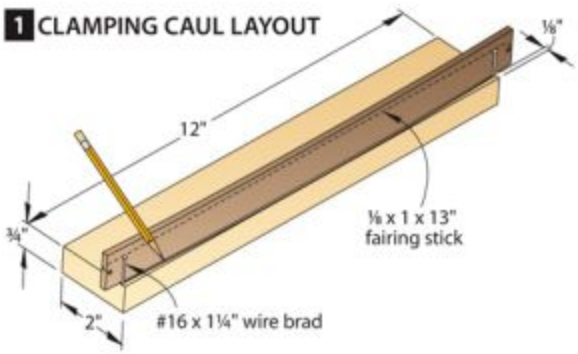


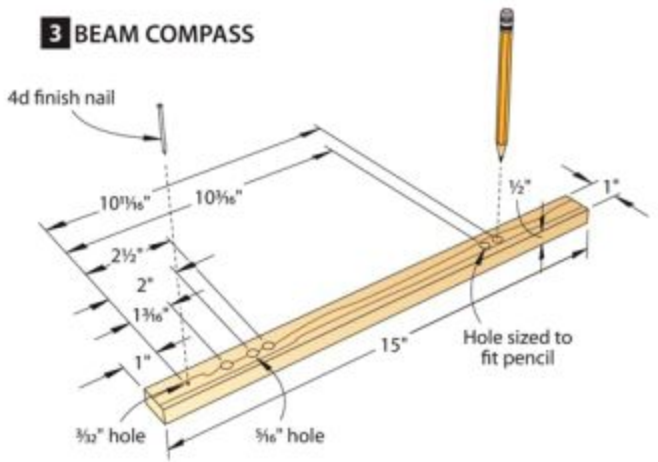
After marking centerlines on the templates, mark the centers of curves. Use the beam compass to draw connected arcs.

Create sanding blocks from portions of the cut-outs and attach 120-grit sandpaper to the edges to sand to the layout lines.

Drive two countersunk screws away from the tray edges to mount the inside template on the tray blank.

With the tray blank (A/B) clamped to your drill-press table, drill overlapping holes between the four starter holes.



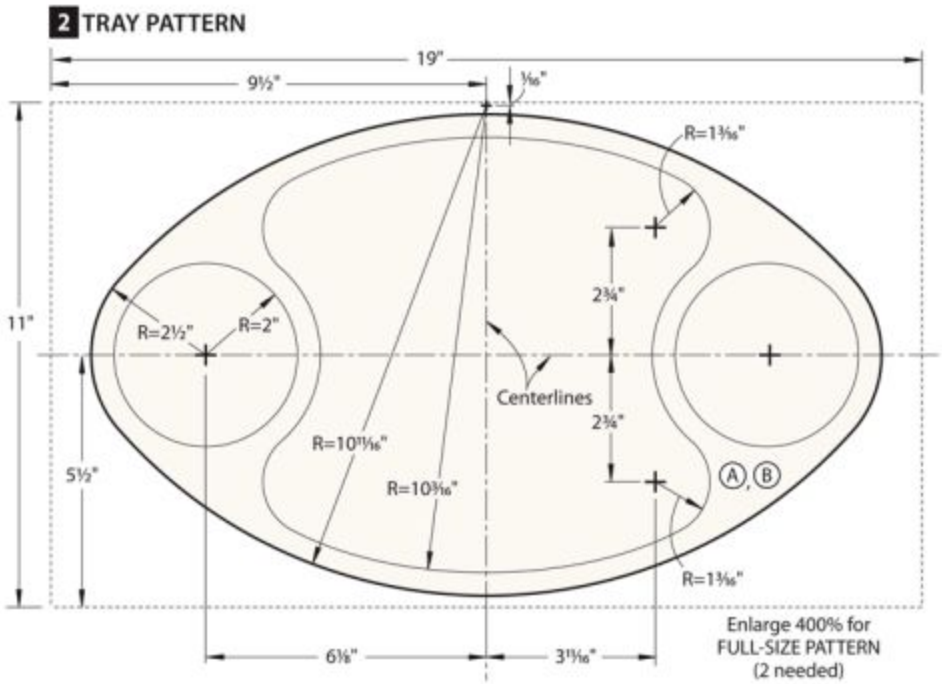


using a jigsaw or scrollsaw. On the outside template, cut the outside shape of the tray. Sand both templates to the layout lines [**Photo C**]. Place the outside template on the inside template. Check that the outside template opening parallels the inside template center opening.

4 In the corner waste areas, drill, countersink, and screw the inside template to the tray blank (A/B) [**Photo D**]. Trace around each opening and remove the template.

5 Mount a Forstner bit from 1" to 1¾" in diameter in your drill press. Starting with the four tight curves at the corners of the center opening, drill overlapping holes ⅛" inside the layout lines and 1⁵⁄₁₆" deep [**Photo E**]. Then drill out waste for the 4" holes. Chisel off waste between the holes.

6 Make an auxiliary router subbase by first drilling a 2" hole centered in a ½×6×18" piece of MDF. Remove your plunge-router subbase plate and center the router chuck over the auxiliary subbase hole. Then mount this subbase to your router. Now attach a collet extension (see **Sources**) to your tray bit [**Photo F**] and chuck the extension and bit in the router.



Rout flat-bottomed holes

1 Reattach the inside template to the tray blank (A/B). Adjust the plunge

EXTEND YOUR BIT'S REACH

F

A collet extension adds 2½" to the shank of this tray bit, allowing it to reach past the template and 2⅛" into the tray openings.

ROUT A FLAT-BOTTOMED TRAY

G

After a series of ¼"-deep cuts, the final pass reveals the contrasting walnut portion of the tray blank (A/B).

ROUT THE INSIDE ROUND-OVERS

H

Place the tray upside down over your round-over bit and rout the inside edges of each tray opening.

depth so the bearing will ride against the template edges and the bit cuts only the blank. Rout around each tray opening and remove the chips.

2 Reset the router plunge depth so that the bearing rides against the edge of the previous cut. Then make a second pass. Repeat until the bit cuts 2⅛" deep [**Photo G**]. (Center the lamination line on the bit radius.) Now rout the centers to flatten the bottoms of the openings.

3 Remove the inside template, place the outside template in position and trace the tray shape on the blank (A/B). Bandsaw the tray and sand to 320 grit.

4 Install a ¼" round-over bit in a table-mounted router and set it to round over the inside edges of each tray opening [**Photo H, Drawing 4**]. Then round over the top and bottom outside edges [**Photo I**]. ***Quick Tip! No table needed.*** If you don't have a router table, use the auxiliary router subbase to stabilize the router as you round over the edges freehand.

5 Sand the edges and insides of the compartments up to 320 grit using sanding sponges. Apply three coats of satin polyurethane, sanding with a 320-grit sanding sponge between coats. Then invite some friends over, stock the tray with chips and let the party begin.

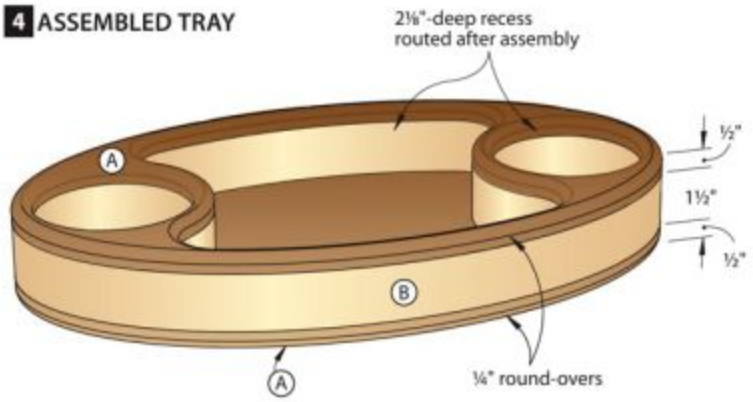
ROUND OVER THE OUTSIDE EDGES

I

Turn the tray counterclockwise as you run the edges against the ¼" round-over bit bearing.

Written by **Bob Wilson** with **Jeff Mertz**
Project design: **Kevin Boyle**
Illustrations: **Roxanne LeMoine**; **Lorna Johnson**

4 ASSEMBLED TRAY



Materials List

Part		FINISHED SIZE T	W	L	Matl.	Qty.
A*	tray top/bottom	½"	11"	19"	W	2
B	tray middle	1½"	11"	19"	M	1

*Parts initially cut oversize. See the instructions.

Materials key: W–edge-glued walnut, M–edge-glued maple.
Bits: 1¼"-diameter bowl/tray bit, ½" collet extension, ¼" round-over bit, 1" to 1¾" Forstner bit.

Sources

Tray router bit: CMT 1¼" -diameter bit no. 851.502.11B, $37.68 from Amazon.com. For an alternate, use 1¼"-diameter bit no. 144-2005B, $40, Eagle America, 800-872-2511 or eagleamerica.com.
Collet extension: CMT ½" collet extension no. 796.001.00, $33.01 from Amazon.com. For an alternate, use extension no. 415-0660, $25.88, Eagle America.

MORE RESOURCES

DOWNLOADABLE PLANS

■ Buy templates and instructions to build a snack tote that complements this tray at woodmagazine.com/snacktote.

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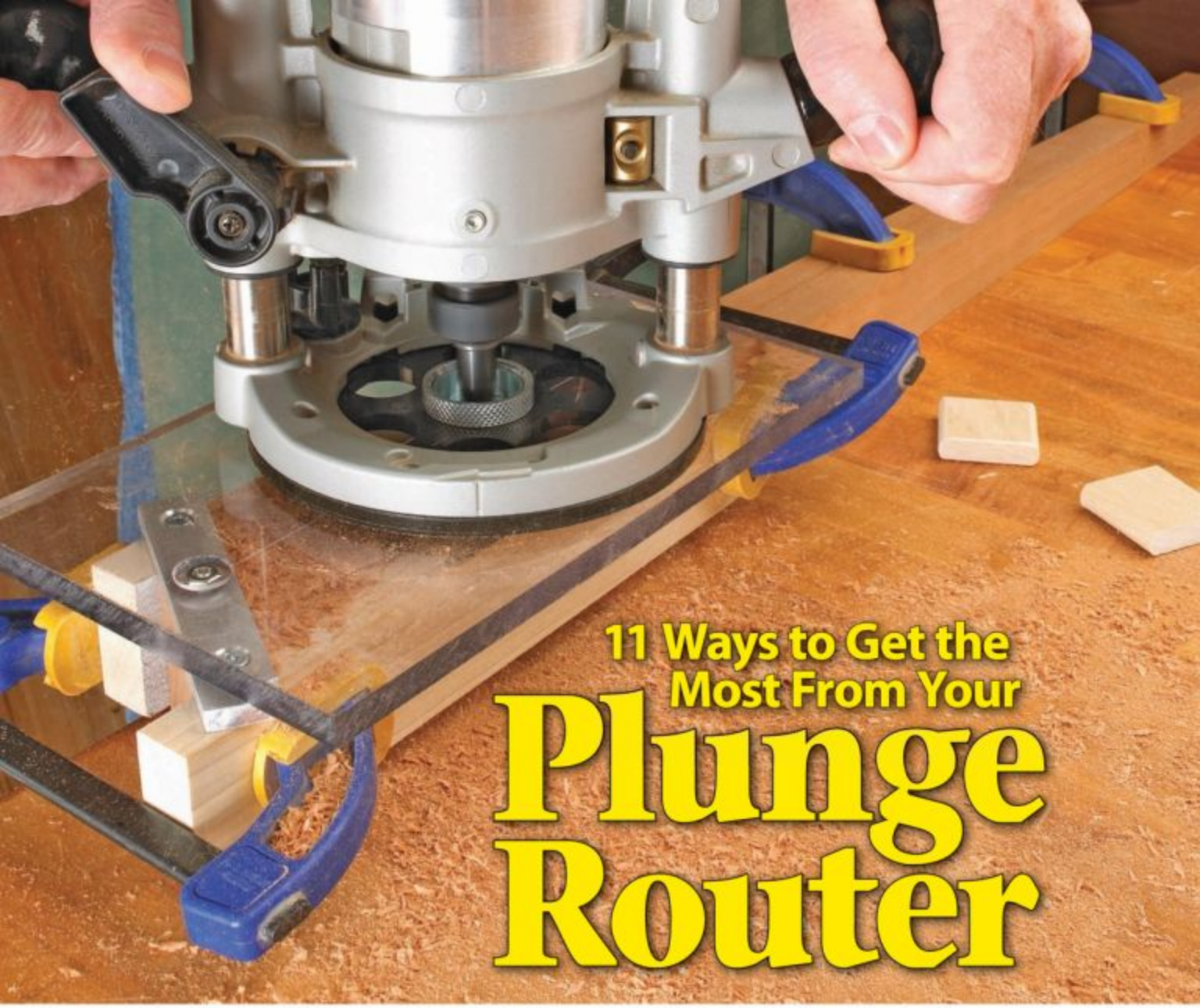


11 Ways to Get the Most From Your Plunge Router

To many woodworkers, a plunge router is like one of those deluxe TV remote controls that has lots of buttons and functions: Most people only use a few of them because they don't understand their full capabilities. Welcome to the plight of the plunge router. Too often this versatile tool gets pushed to the side in favor of its simpler sibling, the fixed-base router. But here are 11 ways a plunge router beats its brother.

1. Mortising

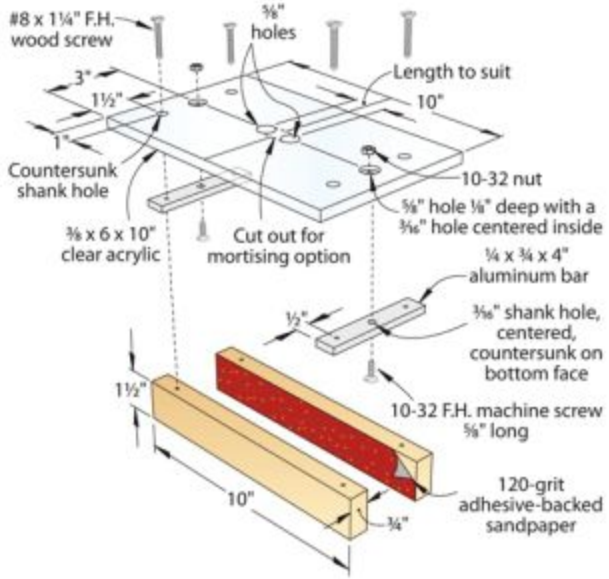
Store-bought or shop-made jigs increase the accuracy of a router as well as its ability to make identical, repeated plunge-router tasks. For example, you don't need to own a hollow-chisel mortiser to make mortises quickly and easily. Simply build the jig shown on the *next page,* grab your plunge router and an upcut spiral bit, and you're in business. Install a ⅝" guide bushing in your router's subbase and a bit that matches the width of your mortise. Center the scribed lines on the jig to your mortise layout lines, and then rout in ¼"-deep increments. Depending on the position of your mortises, sometimes only one of the jig's aluminum cross bars will rest on the workpiece. To keep the jig parallel to the workpiece in these instances, add a ¼" spacer, as shown in **Photo 1**.

For the tenons, you have three options, all of which work equally well. First, you can rout mortises in both of the mating workpieces and make a loose tenon to fit. To do this, dimension stock to the thickness and width you'll need, and then round over the edges on your router table. Second, machine a tenon onto the mating workpiece as you'd do for a rectangular mortise, and then simply round the edges with a knife or rasp. Or third, square the mortise corners with a chisel to fit a matching tenon.

2. Doweling

Make the same jig as for mortising, but rather than slotting the acrylic top, simply bore two ⅜" holes, as shown in **Photo 2**. Make multiple tops with different spacing between the holes for different dowel setups. To use this jig, set it up as you would for mortising, and then plunge the holes to your desired depth. Repeat for the mating workpiece, and assemble the joint with glue and dowels.

MORTISING/DOWELING JIG



TWO TYPES OF JOINTS WITH THE SAME BASIC JIG

Insert a spacer in the mortising jig where this leg's taper begins. That keeps the jig parallel to the mortised surface.

Because the holes on this doweling jig are near the board's end, use a same-thickness scrap for a spacer.

ANATOMY OF A PLUNGE ROUTER

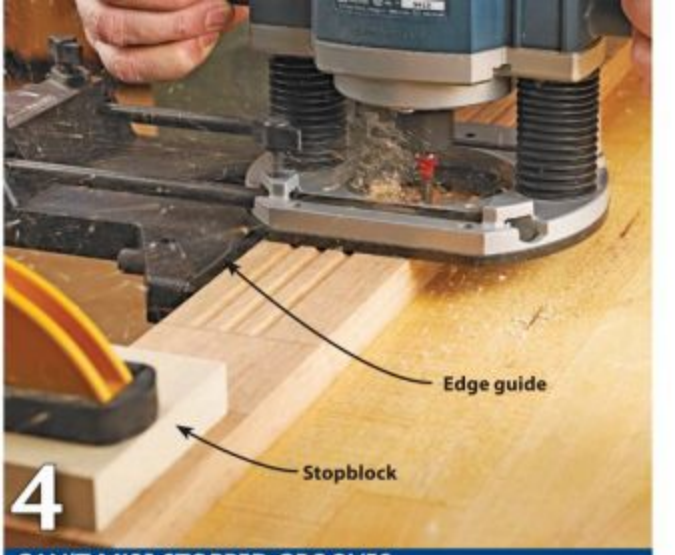
As the name suggests, a plunge router's bread and butter is its ability to lower a bit onto a workpiece and make any number of cuts, such as stopped dadoes or mortises, without needing an entry or exit point along an edge or end. Internal springs make it snap straight up after you finish the cut. You control the depth of cut with a stop rod that contacts a multi-position, rotating turret stop. Using multiple stops, you can rout deeply in small increments before getting to the final depth, avoiding grain tear-out and saving wear on the motor and bit.

In addition to handheld use, a plunge router also excels mounted in a router table. Many models now include built-in lift mechanisms, including some that raise the collet high enough for above-the-table bit changing. Dedicated plunge routers, such as the one shown *below*, do not fit into aftermarket router lifts, but the motors from multibase models (ones that interchange between plunge and fixed bases) fit most lifts and can be easily removed for handheld use in their bases.

Plunge routers range in size from the 1.1-hp Trend T4 (essentially a trim router in a plunge base) to midsize models with 1½ to 2¼ hp to monster routers with 3-plus hp. Most midsize and larger routers come with variable-speed motors and ¼" and ½" collets.

PLUNGE DEEP FOR FOOD SERVERS

Using a wide auxiliary subbase for stability and bit extension for extra depth, you can rout deep bowls and trays.



CAN'T-MISS STOPPED GROOVES

Make flawless stopped grooves or flutes by using an edge guide to keep them straight and stopblocks for matching ends.

3. Interior pattern routing

When you need to rout any type of closed pattern in the interior of a workpiece, such as the chip/dip tray **[Photo 3]** and on *page 50,* choose a plunge router. With a fixed-base router you have to tip the router into the cut—risky because you can damage the workpiece or template or possibly injure yourself.

Whether you use commercial templates or make your own, you'll need to use either a guide bushing or a top-bearing pattern bit to register against the template. For cuts deeper than your bit can reach, use a collet extension, which fits into your router collet and has another collet for your bit.

Collet extension: MLCS Woodworking, part #9464 (½" shank), $25, 800-533-9298, mlcswoodworking.com.

4. Stopped dadoes, grooves, and flutes

When you need to make field cuts like these, tilting a fixed-base router into the workpiece might cause it to veer off track and damage your workpiece. With a plunge router you simply use a clamp-on straightedge or an edge guide **[Photo 4]** made by your router's manufacturer. Add stops at each end, and it's almost goof-proof.

5. Circle routing

To create perfect circles, mount your router to a trammel arm that rotates around a fixed point **[Photo 5]**. With a plunge router you can quickly cut out the workpiece from a larger blank, without need of a saw. Build a trammel arm from our downloadable plan at: woodmagazine.com/routertrammel.

6. Sign-making

You've got two options here. First, you can sketch the lettering onto your workpiece, and then freehand rout along the lines. But that requires a steady hand—one slip-up and you'll have to start over. Or, use a commercial sign-making system **[Photo 6]** with a guide bushing in the plunge base.

SignPro sign-making kit: Milescraft, part #1212, $60, 847-683-9200, milescraft.com.

7. Inlay

As with sign-making, it takes a steady hand to rout inlay recesses freehand. Mess up and you're forced to mend the goof. By using templates with bearing-guided bits or guide bushings, you eliminate the chances of veering off course. And whether the inlay serves for decoration or to patch a flaw in the wood, store-bought kits **[Photo 7]** provide everything you need to rout the recess as well as exact-fitting inlays.

Inlay products: Eagle America, brass inlay kit, part #400-1321, $40; butterfly template, part #400-1914; 800-872-2511, eagleamerica.com.

HOW TO MAKE A PERFECT CIRCLE

This trammel arm adjusts to rout various-sized, dead-on circles every time. Rout in ¼"-deep increments.

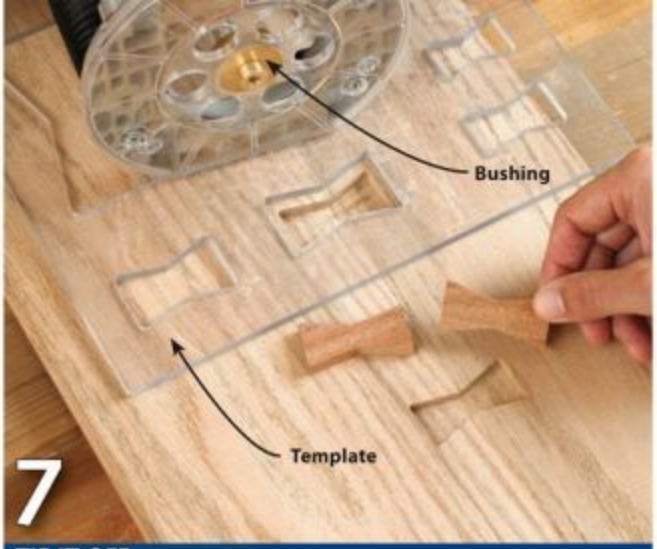
8. Keyholes

Hanging something on a wall but don't want to use a hanger bracket or wire? A slotted keyhole **[Photo 8]** does the job nicely and won't be seen, because the screw head and shank slip into the slot. Many manufacturers make router bits specifically for making these keyhole slots in several sizes; choose the one that best fits the screws you'll use. You can use one keyhole slot for small projects or two or three for larger ones. It's always best to drive the screws into wall studs, so lay out your keyholes accordingly. Whether you place the keyholes on vertical or horizontal elements of your project, the technique is the same. Plunge into the back to the preset depth, and then rout

6

ROUT SIGNS QUICKLY AND EASILY

With this adjustable jig and two sizes of letter templates you can make block-letter signs in just a few minutes.



7

TIE IT OFF

Using this jig, bit, and bushing set, we added decorative butterfly bow ties centered along the glue line of this oak panel.

8

JUST FOR HANGING AROUND

Run your router against a straightedge to keep the keyhole slot parallel to the workpiece.

9

"X" REALLY DOES MARK THE SPOT

Plunge when the crossed lasers hit your mark. Apply self-adhesive sandpaper to the bottom of the acrylic subbase so it won't slip.

about an inch or two of slot. Turn off the router and return to the spot where you plunged in before lifting the router.

9. Dual-light offset subbase

Laser locators and LED lights make this subbase from MLCS ideal for many plunge-routing tasks even if you never hold it by its offset knob. The crosshair lasers prove especially useful for lining up a plunge cut, such as the marble holes in the Chinese-checkers board shown **[Photo 9]**. Flip the switch the other way, and bright LED lights illuminate hard-to-see tasks.

On-Point Dual-Light Subbase: MLCS, part #9098, $60, 800-533-9298, mlcswoodworking.com.

10. Shelf-pin holes

By making the Quick & Easy Jig on *page 18*, you can use your plunge router to bore any number of perfectly aligned shelf-pin holes.

11. Dust hoods

Some router manufacturers include dust hoods with their routers, but many also come as accessories. Typically made of clear plastic, these prove helpful in gobbling up chips and dust when hooked to a shop vacuum.

MORE RESOURCES

- **Router techniques:** View more than two dozen FREE router technique articles at woodmagazine.com/routertechniques.
- **Router reviews:** View seven pay-per-download router and accessory reviews at woodmagazine.com/routerreviews.
- **Chinese checkers game board:** Buy the downloadable plan and pattern at woodmagazine.com/chinesecheckers.

Written by **Bob Hunter** with **Kevin Boyle** and **Jeff Mertz**
Illustrations: **Roxanne LeMoine**; **Lorna Johnson**

Jewelry Box

Behind those sinuous curves lies straightforward construction.

Overall dimensions: 14" wide × 8¼" deep × 7⅞" high.

Spend just a few evenings in the shop crafting this box, then let its curves bedazzle its recipient. Joinery for the carcase and drawers requires only a router table with a couple of straight bits; your bandsaw makes easy work of the flowing lines on the front.

Construct the case

1 Glue up a ½"-thick blank for the sides (A) and cut them to size [**Materials List,** *page 62*]. Glue up two 8¼×14" blanks for the top and bottom (B) and edging (C). After the glue has dried, rip a 7"-wide top/bottom from each blank. Save the cutoff for the edging. Mark the top, bottom, and the mating cutoffs so you can reorient them properly after cutting the edging to shape.

2 Using a ¼" straight bit in your router table, rout the dadoes across the top (B) and bottom (B) [**Drawing 1**]. Use a

Align the marks you made on the edging (C) and the top or bottom (B). The matching grain pattern makes the joint line disappear.

Apply glue to the rabbets in the sides (A) and clamp them to the top and bottom (B), snug against the edging (C).

Trace the shape of the edging (C) onto the front feet (E). Cut away most of the waste on the bandsaw, then sand to the line.

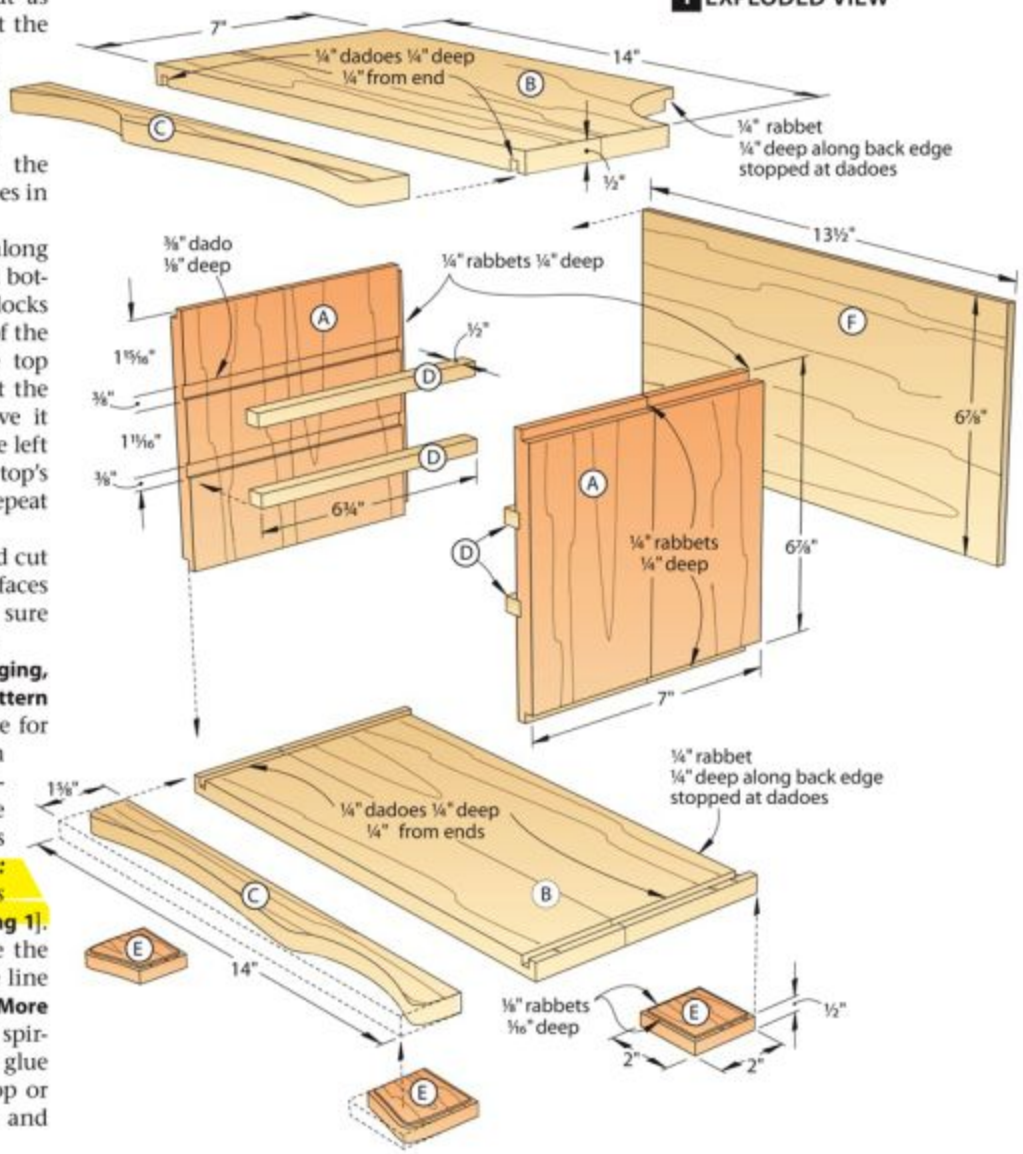
backer board to prevent tear-out as the bit exits the workpiece. Reset the fence flush with the back edge of the bit. Cut the rabbets along the top, bottom, and back inside edges of the sides (A), sneaking up on the final depth until the tongues on each end fit the dadoes in the top and bottom (B).

3 To rout the stopped rabbet along the back edges of the top and bottom (B) [**Drawing 1**], clamp stopblocks to the fence 13½" on either side of the bit. With the right end of the top against the right stopblock, pivot the workpiece into the bit and move it along the fence until reaching the left stopblock. Quickly swing the top's right end away from the bit. Repeat this process on the bottom (B).

4 Switch to a ⅜" straight bit and cut the dadoes across the inside faces of the sides (A) [**Drawing 1**]. Make sure you end up with mirrored sides.

5 Make four copies of the **Edging, Upper/Lower Drawer Pull Pattern** on *pages 60–61* and set two aside for later. Use spray adhesive to attach a copy to each edging (C), aligning the straight back edge of the pattern with the edge that mates with the top/bottom (B). ***Note:*** *Flip the pattern over so the curve is reversed on the top edging* [**Drawing 1**]. At the bandsaw, cut just outside the curved line, then sand up to the line by hand or with a drum sander [**More Resources**, *page 62*]. Use mineral spirits to remove the pattern, then glue each edging (C) to its mating top or bottom (B), keeping the faces and ends flush [**Photo A**].

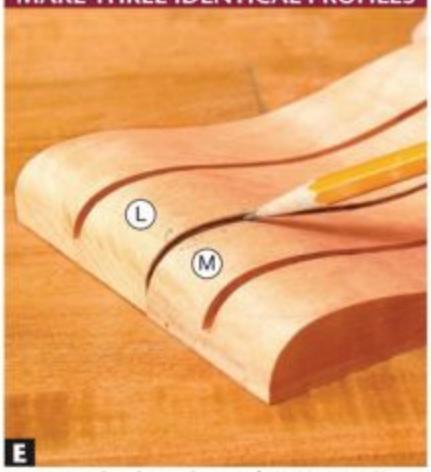
1 EXPLODED VIEW



CUT THE FACES TO ROUGH SHAPE

On the bandsaw, cut just outside the pattern line on each drawer face (L, M, N); then sand up to the line on a drum sander.

MAKE THREE IDENTICAL PROFILES



Compare the three drawer faces (L, M, N); then trace the lowest profile among them onto the other two. Sand to the lines.

6 Mill the drawer runners (D) to fit in the dadoes in the sides (A), then glue and clamp them in place [**Drawing 1**]. After the glue dries, glue the side assemblies (A/D) and top/bottom (B/C) together [**Photo B**].

7 Cut four feet (E) and place one under each corner of the case with the front feet flush to the side of the case and protruding 1/16" in front. Make sure the grain runs side-to-side, then trace the edging (C) onto the front feet [**Photo C**]. Cut and sand them to shape, then rout rabbets around all four edges of each foot [**Drawing 1**]. ***Quick Tip! Keep your fingers away from your feet.*** Grip the feet in a handscrew or use a push pad to guide them past the router bit. Sand the feet to 220 grit, then glue them to the bottom of the case flush with the edges, front, and back.

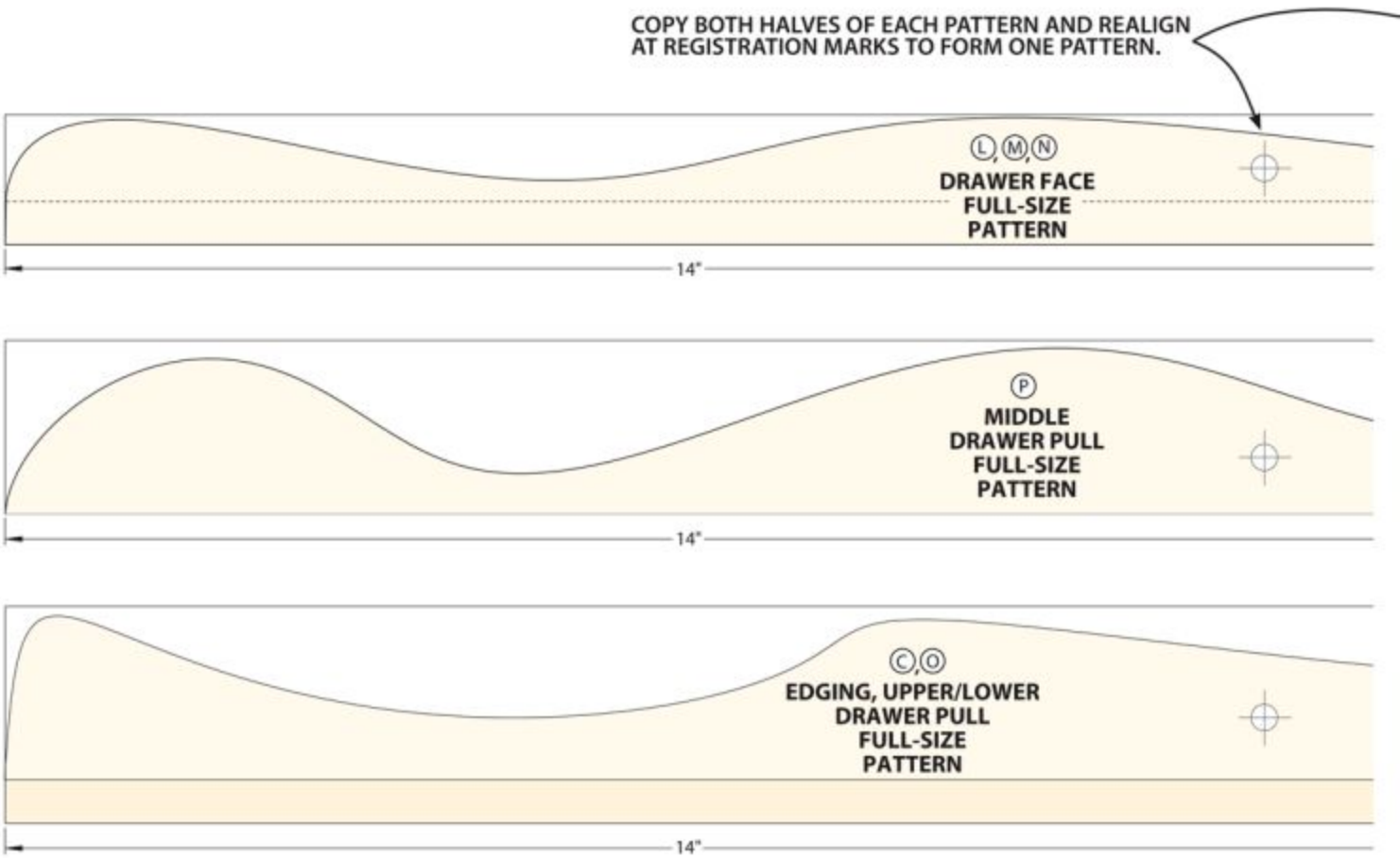
8 Cut the back (F) to fit in the rabbets in the sides (A) and top/bottom (B) and glue it in place.

Make a set of drawers

The two upper drawer boxes are identical; the lower drawer is taller [**Drawing 2**].

1 Cut the drawer fronts/backs (G, I) and sides (H, J) to size. With a ¼" straight bit in your router table, rout the ⅛"-deep rabbets on the ends of the drawer sides and along the bottom edges of the sides and fronts/backs. Dry-fit the drawer parts and measure for the bottoms (K). Cut the bottoms to size, then glue and clamp the drawers together, making sure that they are flat and square. After the glue dries, check the fit of the drawers in the carcase. Plane or sand the drawers as needed for a smooth-sliding fit.

2 From ¾"-thick stock, cut the drawer faces (L, M, N) to size. ***Quick Tip! Go with the (grain) flow.*** Cut all three faces from a 7"-wide board to get a continuous grain flow across the

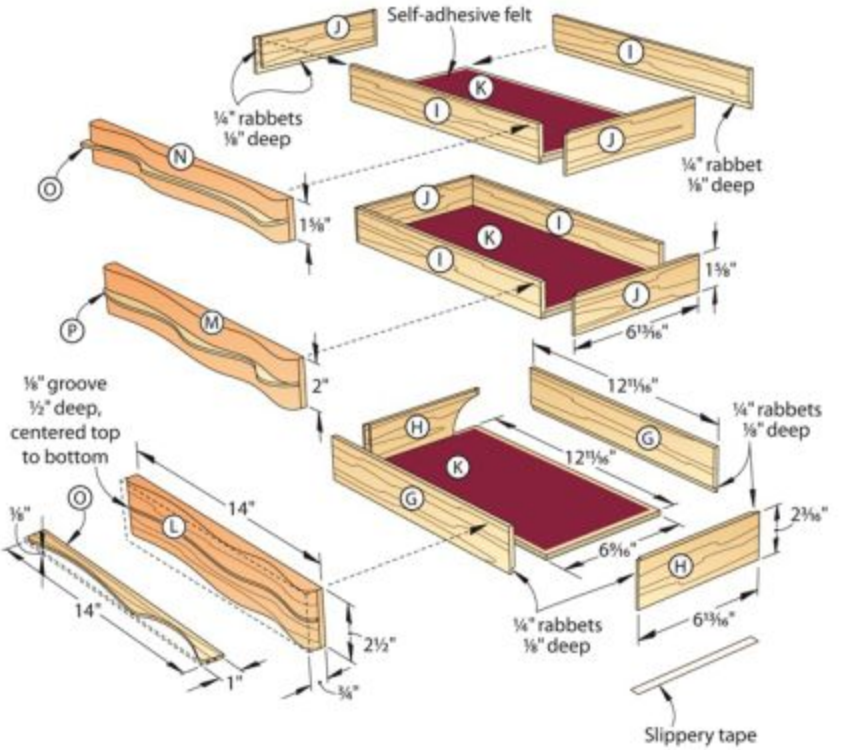


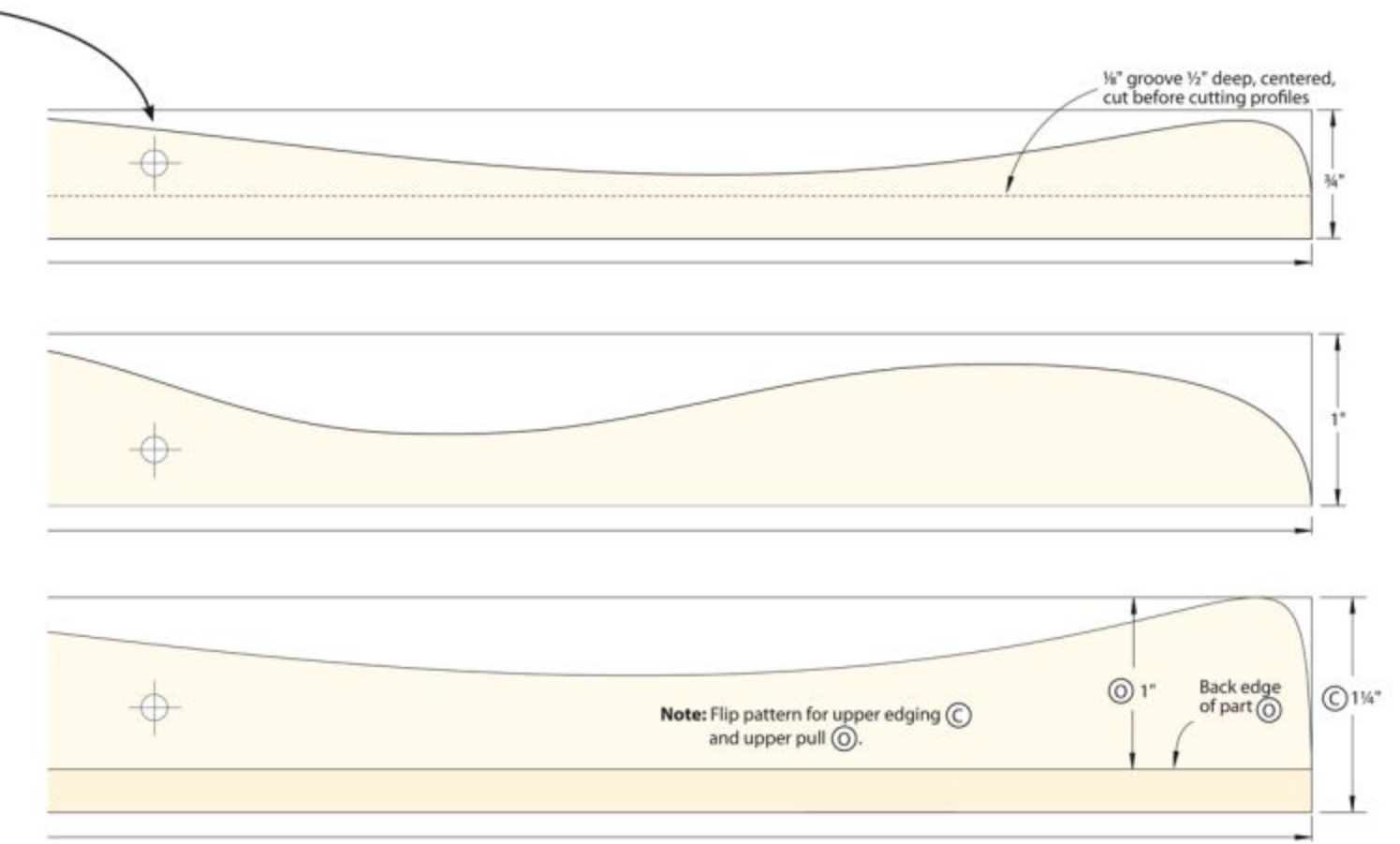
front of the case. Cut a ⅛" groove ½" deep centered on each drawer face's width [**Drawing 2**].

3 Make three copies of the **Drawer Face Pattern** *below* and spray-adhere one to the edge of each drawer face (L, M, N). Bandsaw just outside the line [**Photo D**]; then sand up to the line. Lay the three drawer faces faceup and trace the thinnest profiles onto the thickest [**Photo E**].

4 Plane stock for the upper/lower drawer pulls (O) and the middle drawer pull (P) to fit in the grooves in the drawer faces (L, M, N) [**Shop Tip**, *page 62*], then cut the pulls to size. Make one copy of the **Middle Drawer Pull Pattern** and retrieve the two remaining copies of the **Edging, Upper/Lower Drawer Pull Pattern.** Spray-adhere one pattern to each of the pulls, then cut and sand them to finished shape.

5 ***Quick Tip! Get flat-bottomed grooves.*** If your saw blade didn't cut a flat-bottomed groove in the drawer faces (L, M, N), stick self-adhesive sandpaper to the edge of a cutoff from the drawer pulls (O, P) and sand the bottom flat. Glue the drawer pulls in place, seated fully in the grooves in the drawer




⅛" groove ½" deep, centered, cut before cutting profiles
¾"
1"
Note: Flip pattern for upper edging C and upper pull O.
O 1"
Back edge of part O
C 1¼"

SHOP TIP

Planing thin parts

Workpieces thinner than 3/16" may break apart when fed through a planer. To reduce that likelihood, use double-faced tape to fasten each piece to a sled, then run the sled through. Use 1/2" or 3/4" MDF or melamine for the sled, or plywood if it's flat. Taking light cuts and using your planer's fastest cutter speed and slowest feed rate also helps to reduce chip-out.

faces. Note that the curve of the top pull should match that of the top edging (C), and the curve of the bottom pull should match the bottom edging.

6 Glue the middle and upper drawer faces (M, N) flush with the bottom of the drawer. Glue the bottom drawer face (L) 1/16" above the bottom of the drawer to create a gap below the drawer face when it is slid into the case.

7 Sand all parts to 220 grit, then apply a finish. We wiped on a coat of boiled linseed oil followed by three coats of aerosol lacquer, sanding lightly between coats with a 320-grit sanding sponge.

8 After the finish dries, apply self-adhesive felt to the inside of the drawer bottoms (K), and slippery tape to the bottom edge of the bottom drawer sides (H).

Written by **Craig Ruegsegger** with **Kevin Boyle**
Project design: **Jeff Mertz**
Illustrations: **Roxanne LeMoine**; **Lorna Johnson**

Materials List

Case		FINISHED SIZE T	W	L	Matl.	Qty.
A	sides	½"	7"	6⅞"	EC	2
B*	top/bottom	½"	7"	14"	EM	2
C*	edging	½"	1¼"	14"	EM	2
D	drawer runners	⅜"	½"	6¾"	M	4
E	feet	½"	2"	2"	C	4
F	back	¼"	6⅞"	13½"	BP	1
Drawers						
G	lower front/back	¼"	2⅜"	12 1/16"	M	2
H	lower sides	¼"	2⅜"	6 3/16"	M	2
I	upper fronts/backs	¼"	1⅜"	12 1/16"	M	4
J	upper sides	¼"	1⅜"	6 3/16"	M	4
K	bottoms	¼"	6⅜"	12 1/16"	BP	3
L	lower face	¾"	2½"	14"	C	1
M	middle face	¾"	2"	14"	C	1
N	upper face	¾"	1⅜"	14"	C	1
O	upper/lower pulls	⅛"	1"	14"	M	2
P	middle pull	⅛"	1"	14"	M	1

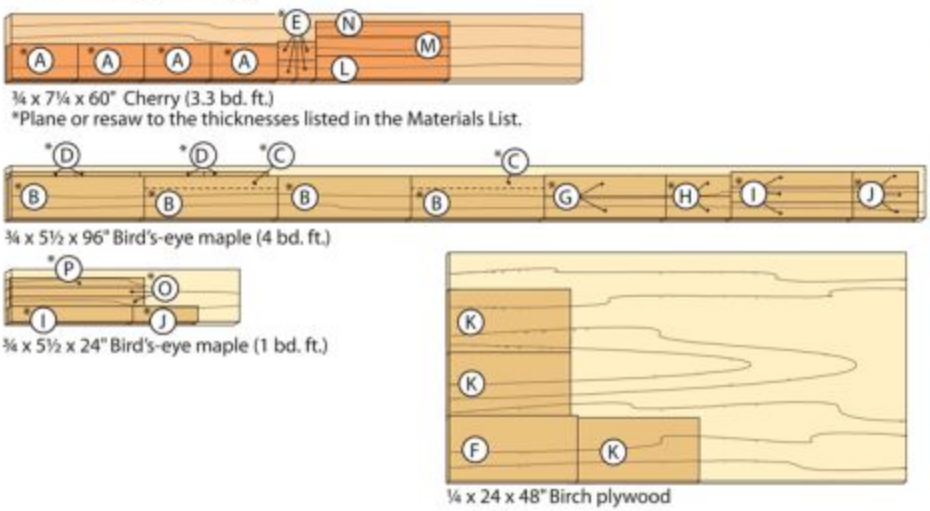
*Parts cut from same blank. See the instructions.

Materials key: EC–edge-glued cherry; EM–edge-glued bird's eye maple; C–cherry; BP–birch plywood.
Supplies: Spray adhesive.
Bits: ¼", ⅜" straight router bits.

Sources

Self-adhesive felt: Red self-adhesive felt 17×24" (1) item 76K04.05, $13.80, Lee Valley, 800-871-8158, leevalley.com.
Slippery tape: 1"×18' (1) item 25U04.01, $11.50, Lee Valley.
Kit: For a lumber kit for the jewelry box, call Heritage Building Specialties, 800-524-4184, heritagewood.com. Order kit W195.

Cutting Diagram



MORE RESOURCES

FREE VIDEO

■ Turn your electric drill into a portable drum sander at woodmagazine.com/drillsanding

RELATED ARTICLE

■ "Portable Drum Sander," issue 185 (September 2008) $

($=download this article for a small fee from woodmagazine.com/plans. Type "drum-sander" in the Search box.)

©2009 Media Services S-8430 OF21964R-1 Advertisement

Bob Vila endorses and recommends the famous EdenPURE® portable heater

Millions of Americans now saving up to 50% on their heating bills and raving about the "heavenly heat"

Does not get hot, cannot start a fire and will not reduce humidity or oxygen

The famous infrared portable heater, the EdenPURE®, which can cut your heating bills by up to 50%, has been greatly improved.

The new EdenPURE® GEN3 heater heats better, faster, saves more on heating bills and runs almost silent.

The EdenPURE® can pay for itself in a matter of weeks and then start putting a great deal of extra money in your pocket after that.

A major cause of residential fires in the United States is portable heaters. But the EdenPURE® cannot cause a fire. That is because the advanced infrared heating element never gets to a temperature that can ignite anything.

The outside of the EdenPURE® only gets warm to the touch so that it will not burn children or pets.

The EdenPURE® will also keep you healthy. That is because, unlike other heating sources, it will not reduce humidity or oxygen in the room.

The advanced space-age EdenPURE® Infrared Portable Heater also heats the room evenly, wall-to-wall and floor-to-ceiling. And, as you know, most other portable heaters only heat an area a few feet around the heater.

Unlike other heating sources, the EdenPURE® cannot put poisonous carbon monoxide, any type of fumes or any type of harmful radiation into a room.

Q. What is the origin of this amazing heating element in the EdenPURE®?

A. This advanced heating element was discovered accidentally by a man named John Jones.

Q. What advantages does this advanced infrared heating process have over other heating source products?

Never be cold again

Cannot start a fire; a child or animal can touch or sit on it without harm

Pictured above is Bob Vila demonstrating the famous EdenPURE® GEN3 Model 1000 heater with a family. It saves big money on your heating bill while keeping you toasty warm with "heavenly heat".

A. This infrared heating process was designed around the three most important consumer benefits: economy, comfort, and safety.

In the EdenPURE® process, electricity is used to generate a type of infrared heat which, in turn, creates a very safe heat.

Q. How can a person cut their heating bill by up to 50% with the EdenPURE®?

A. The EdenPURE® will heat a room in minutes. Therefore, you can turn the heat down in your house to as low as 50 degrees, but the room you are occupying, which has the EdenPURE®, will be warm and comfortable. The EdenPURE® is portable. When you move to another room, it will quickly heat that room also. This can drastically cut heating bills, in some instances, by up to 50%.

End of interview.

The EdenPURE® will pay for itself in weeks. It will keep a great deal of extra money in a users pocket. Because of today's spiraling gas, oil, propane, and other energy costs, the EdenPURE® will provide even greater savings as the time goes by.

The EdenPURE® heater is now greatly improved. With no increase in price, the new EdenPURE® has been updated with the latest technology, safety, and comfort features to provide you with even greater comfort, more savings, and years of reliability. The EdenPURE® comes with a comprehensive three year warranty along with a 60-day no questions asked satisfaction guarantee – we pay the return shipping.

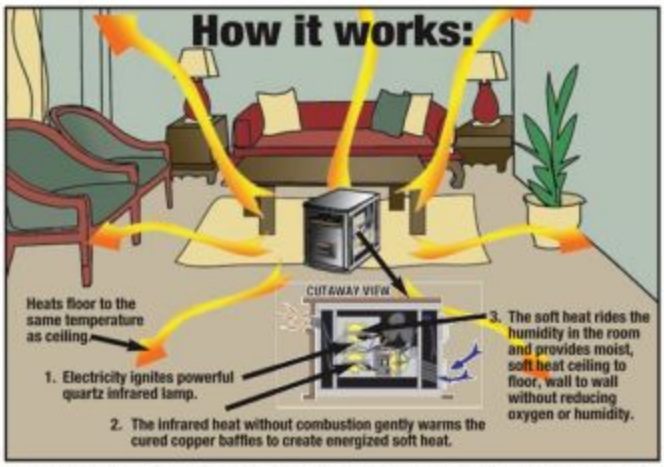
This product has been listed by Underwriters Laboratories.

Testimonials from a few of the millions of satisfied EdenPURE® customers

The EdenPURE® has cut my gas bill to a third of what it was last year. ***Leslie Wilson, Vancouver, WA***

The EdenPURE® really puts out the heat like a little solar furnace. It's below freezing outside and cozy warm in the rather over large living room area where I'm using it. I have already noticed a 40 to 60% drop in the cost of my heating bills. ***George B., Triangle, N.Y.***

How it works:


CUTAWAY VIEW
Heats floor to the same temperature as ceiling
1. Electricity ignites powerful quartz infrared lamp.
2. The infrared heat without combustion gently warms the cured copper baffles to create energized soft heat.
3. The soft heat rides the humidity in the room and provides moist, soft heat ceiling to floor, wall to wall without reducing oxygen or humidity.

SPECIAL READER'S DISCOUNT COUPON

The price of the EdenPURE® GEN3 Model 500 is $372 plus $17 shipping for a total of $389 delivered. The GEN3 Model 1000 is $472 plus $27 shipping and handling for a total of $499 delivered. People reading this publication get a $75 discount plus free shipping and handling and pay only $297 delivered for the GEN3 Model 500 and $397 delivered for the GEN3 Model 1000 if you order within 10 days. The EdenPURE® GEN3 comes in the decorator color of black with burled wood accent which goes with any decor. There is a strict limit of 3 units at the discount price - no exceptions please.

Check below which model and number you want:

☐ GEN3 Model 500, number _____ ☐ GEN3 Model 1000, number _____

- To order by phone, call TOLL FREE **1-800-588-5608 Authorization Code EHS1247**. Place your order by using your credit card. Operators are on duty Monday - Friday 6am - 3am, Saturday 7am - 12 Midnight and Sunday 7am - 11pm, EST.
- To order online, visit www.edenpure.com enter **Authorization Code: EHS1247**
- To order by mail, by check or credit card, fill out and mail in this coupon.

This product carries a 60-day satisfaction guarantee. If you are not totally satisfied return at our expense, and your purchase price will be refunded – no questions asked. There is also a three year warranty.

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Check below to get discount:

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☐ I am ordering past 10 days of the date of this publication, therefore I pay shipping and handling and full price totaling $389 for GEN3 Model 500 and $499 for GEN3 Model 1000.

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PROJECT HIGHLIGHTS

- Overall dimensions are 22" wide × 5½" deep × 8⅝" high.
- Learn how to scrollsaw perfectly fitted parts from two different wood species at the same time.

A little horsing around with your scrollsaw and you'll have these farm friends finished before you can say E-I-E-I-O. Not ba-a-a-a-d.

Scrollsawn Barnyard Puzzle

This herd of happy animals is a puzzle within a puzzle, where each one can be assembled and repositioned on the slotted base for hours of play.

Animal hows

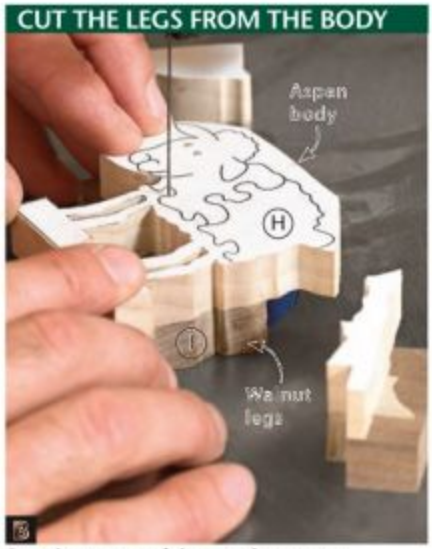
1 Edge-glue a panel for the barn (A) blank. Then cut blanks for parts B–I and cut the base (J) to size [**Materials List**, *page 65*]. Sand the blanks to 180 grit.

2 Download [see **More Resources**] or photocopy patterns for the barn (A), horse (B), cow (C), goat (D), pig (E), tractor (F), wagon (G), sheep body (H), and sheep legs (I). Apply the patterns to blanks using spray adhesive, noting the grain orientation shown. Using a #2 scrollsaw blade, cut the outlines of parts A–G. For the sheep, attach the leg (I) blank to the underside of the body (H) blank with double-faced tape [**Photo A**], and cut the legs.

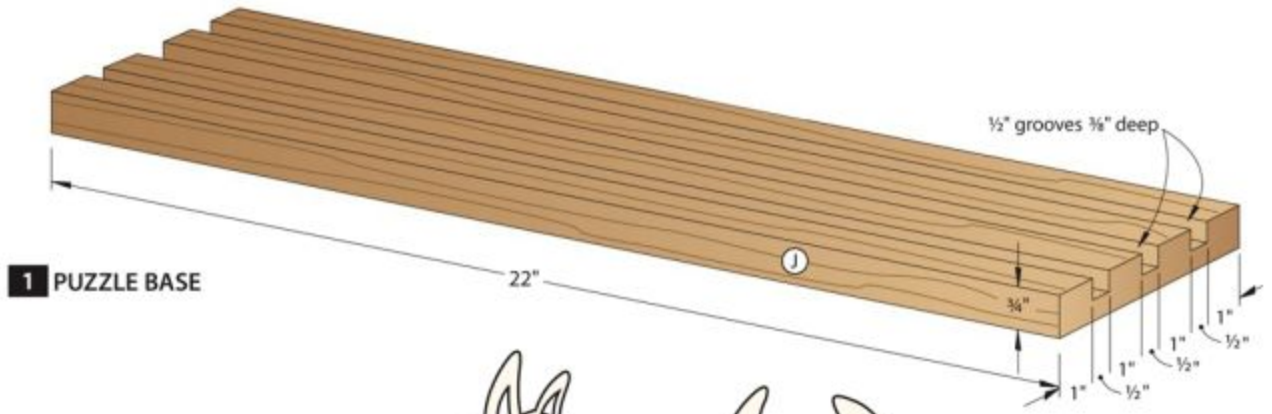
CUT TWO BLANKS AT ONCE

Adhere a blank for the sheep legs (I) to the body (H), and saw out waste between both pairs of legs. Then saw away waste along the outsides of the legs.

CUT THE LEGS FROM THE BODY

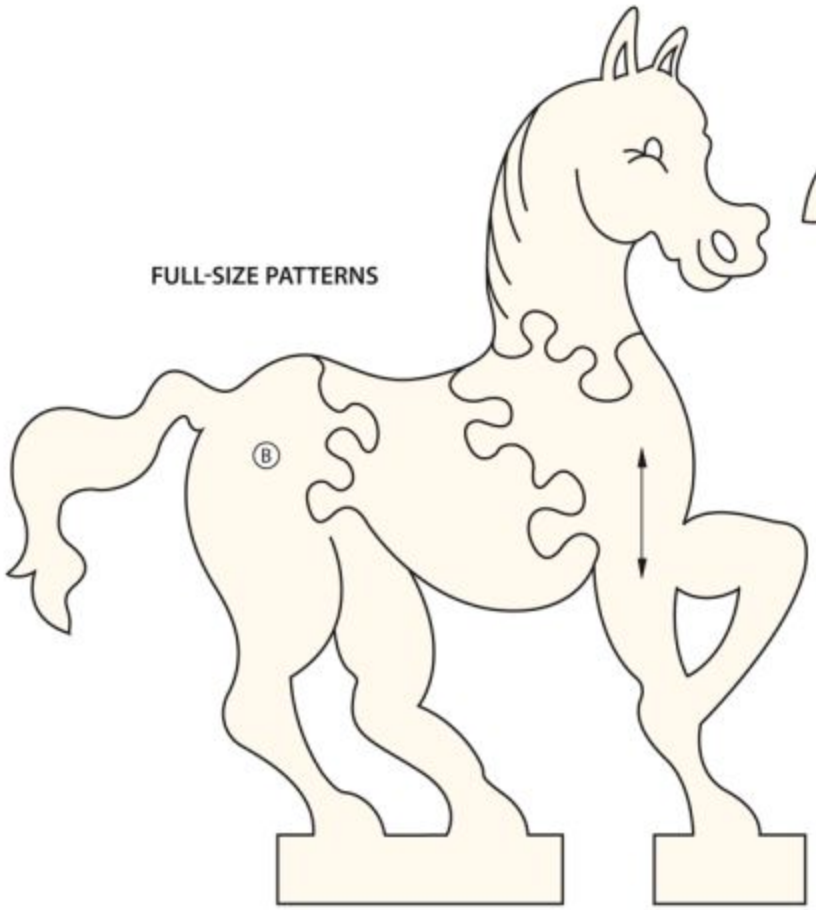


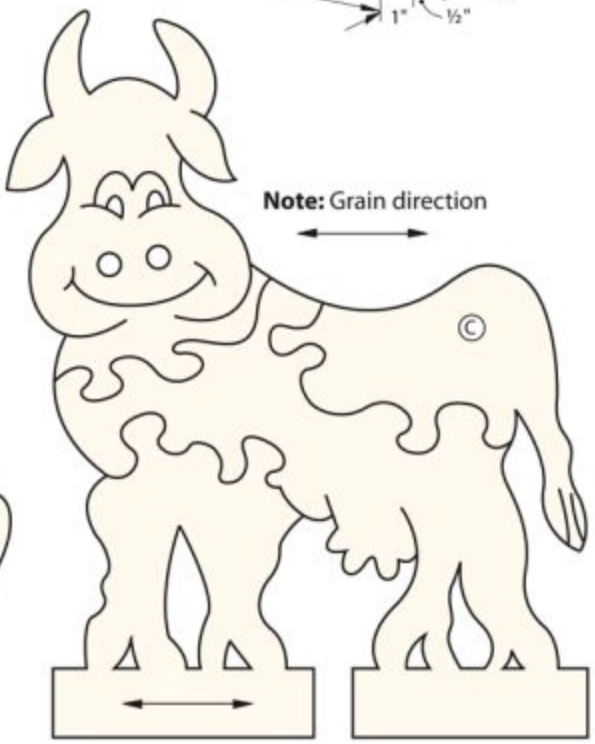
Saw the curves of the puzzle parts to separate the sheep legs (I) from the body (H). Remove the waste still taped to the body before sawing the rest of the sheep body.



1 PUZZLE BASE

FULL-SIZE PATTERNS





Note: Grain direction

Materials List

Part*		FINISHED SIZE T	W	L	Matl.	Qty.
A	barn	½"	15"	9"	YP	1
B	horse	½"	5¼"	5¼"	W	1
C	cow	½"	4¼"	3¾"	C	1
D	goat	½"	4"	3½"	A	1
E	pig	½"	3½"	3"	L	1
F	tractor	½"	5"	5½"	R	1
G	wagon	½"	3"	5¼"	R	1
H	sheep body	½"	3¼"	3½"	AS	1
I	sheep legs	½"	2"	3½"	W	1
J	base	¾"	5½"	22"	C	1

*All part dimensions, except for the base (J), are for blanks to be scrollsawn.

Materials key: YP–yellow pine, W–walnut, C–cherry, A–ash, L–Lyptus, R–redwood, AS–aspen.
Supplies: Double-faced tape.
Blades and bit: ½" dado set, #2 and #2/0 scrollsaw blades, ⅛" drill bit.

3 Switch to a #2/0 blade for a close fit between the puzzle pieces. Drill and cut the animal faces. Then cut the individual puzzle parts where shown on the patterns [**Photo B**].

4 Cut ½" grooves ⅜" deep in the base (J) where shown [**Drawing 1**]. Sand the base to 180 grit, touch-up-sand the figures as needed and apply three coats of clear finish. (We used spray lacquer, sanding between coats with 320-grit sandpaper.)

Written by **Bob Wilson** with **Kevin Boyle**
Project design: **Kevin Boyle**
Illustrations: **Roxanne LeMoine**; **Lorna Johnson**

MORE RESOURCES

DOWNLOADABLE PATTERNS

■ Don't want to cut up this magazine? You'll find free downloadable patterns of all the animals and figures at woodmagazine.com/barnyard.

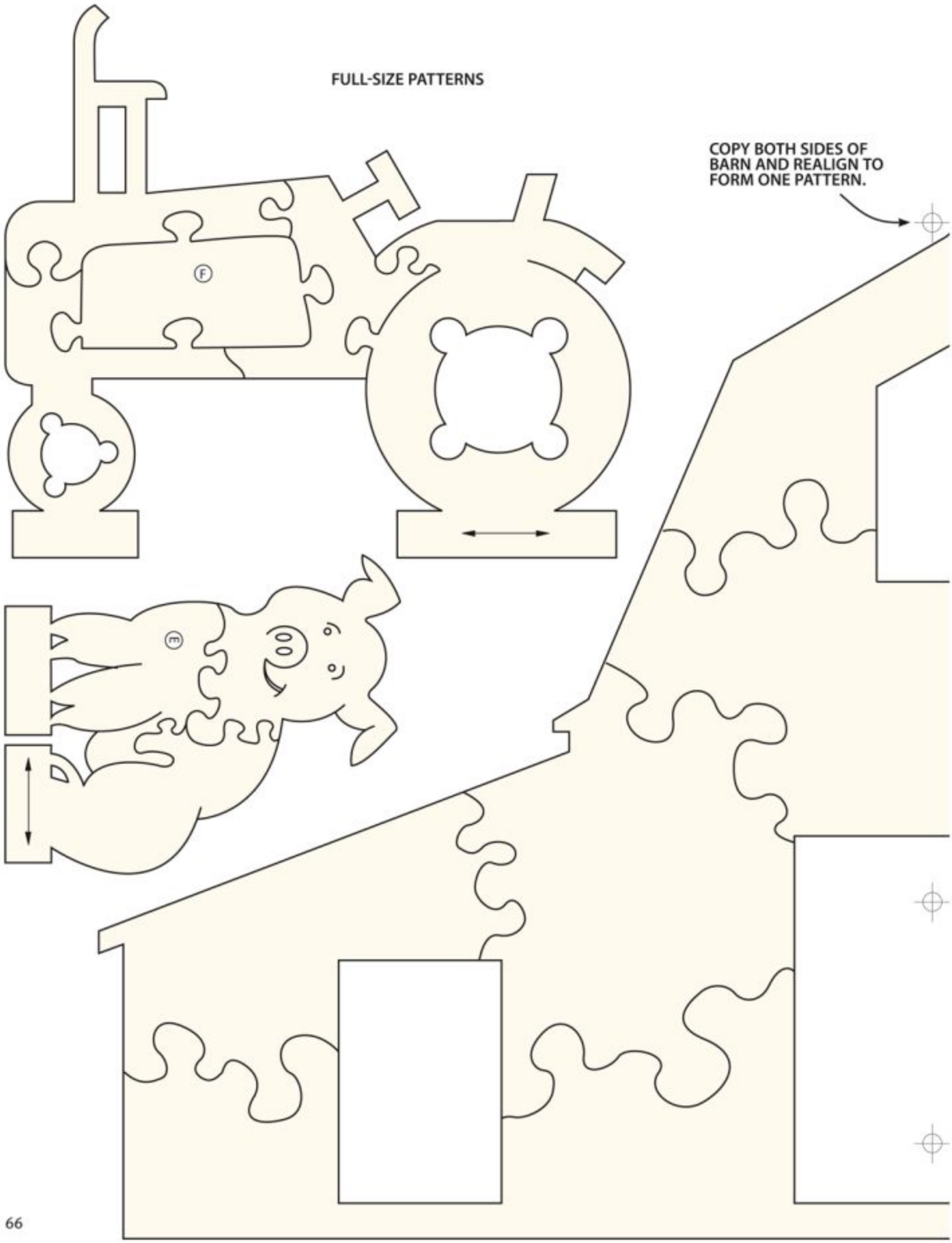
ADDITIONAL PUZZLE PLANS

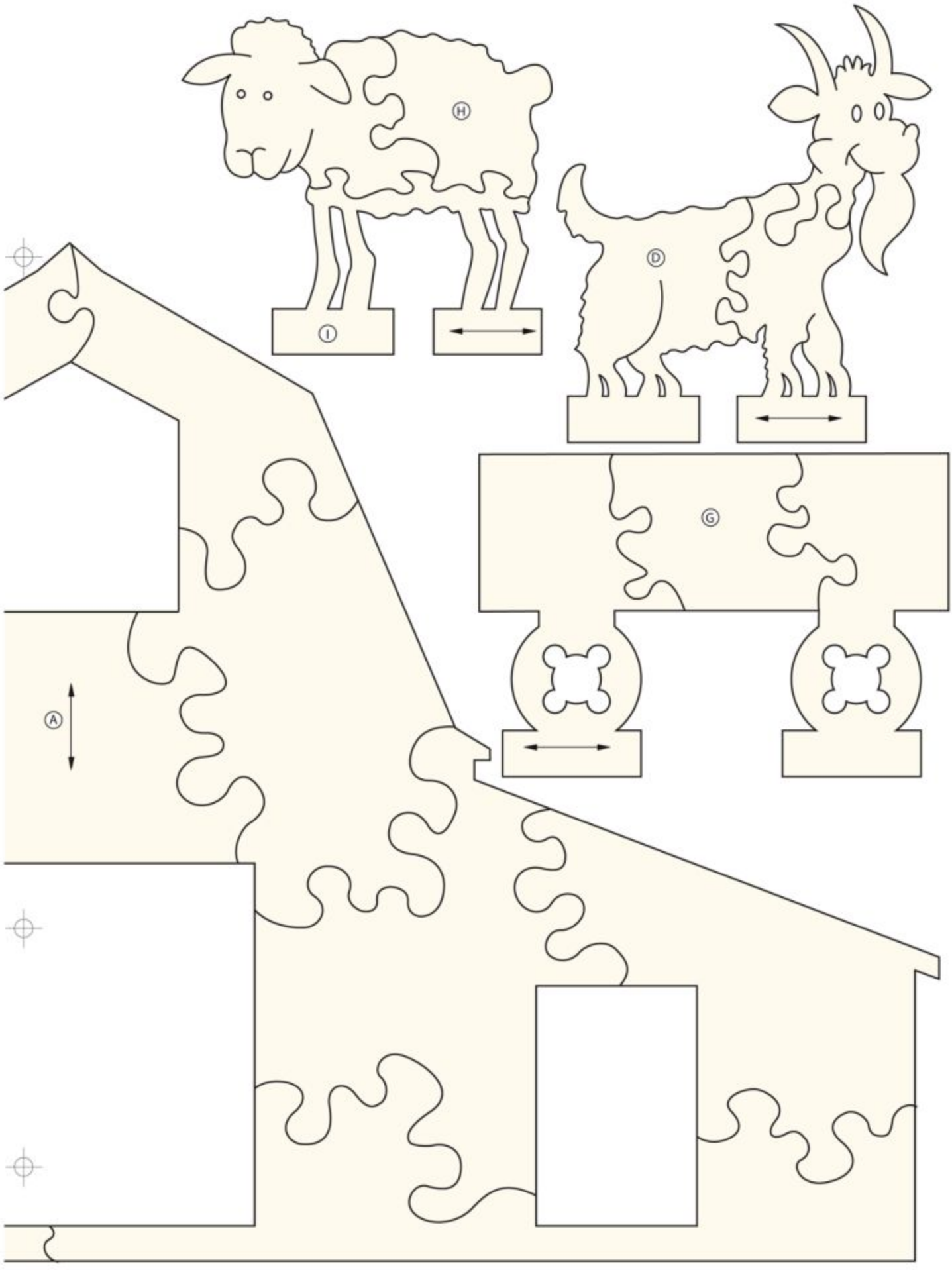
■ Go wild with our safari scrollsaw puzzle at woodmagazine.com/safari. $

■ Reel in a big one—our fish scrollsaw puzzle—at woodmagazine.com/fishy. $

While you're there, look at plans for our other games and puzzles.

($–Download this article from woodmagazine.com/plans for a small fee. Type "puzzle" in the Search box.)


FULL-SIZE PATTERNS
COPY BOTH SIDES OF BARN AND REALIGN TO FORM ONE PATTERN.
F
E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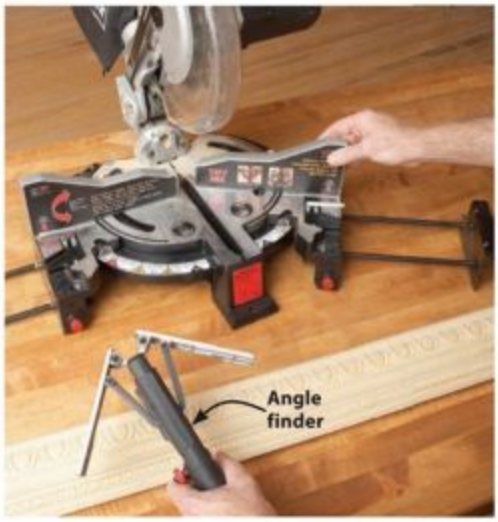
2010 EDITORS' CHOICE

Top New Tools

We select the most promising woodworking tools and accessories for the coming year.



Transfer corner angles to this mitersaw's movable fences

Craftsman's 10" MiterMate compound mitersaw eliminates the middleman when it comes to cutting trim. Instead of making several test cuts to get the perfect fit for mating trim pieces, you use the included angle finder to duplicate the corner. Next, you transfer that angle to the saw by pivoting the fences—not the blade—to match. Then you simply cut both pieces on their respective sides for an exact fit. Each fence pivots 45° front and back so you can cut inside and outside corners. They also line up straight as on a standard mitersaw. The saw bevels up to 45° to the left.

Craftsman
MiterMate Mitersaw, $250
800-383-4814, craftsman.com

Enjoy cookies with your woodworking

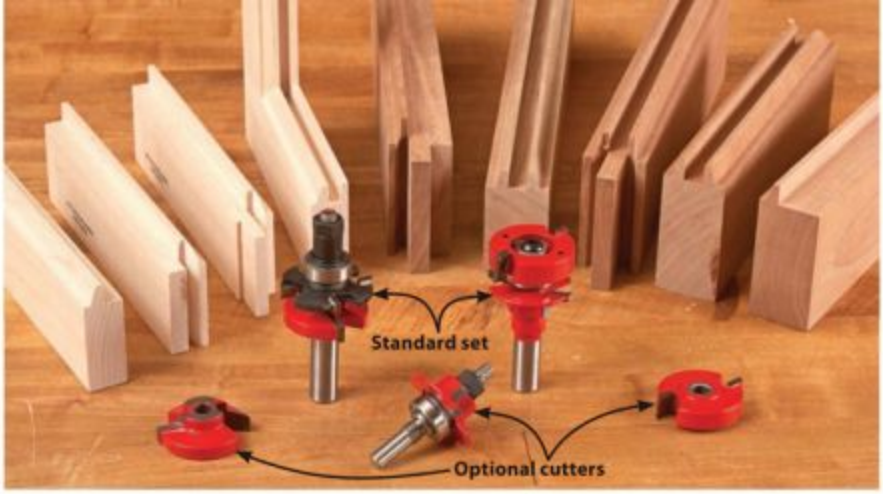
Leave it to the guys in hockey-mad Minnesota to come up with the puck-like Bench Cookies. With a rubbery, textured pad on each face, these pads grip workpiece and workbench equally well, even when routing. And the 1" thickness elevates the workpiece to allow clearance for router-bit bearing screws, as well as access to edges for finishing tasks.

Rockler
Bench Cookies, $12 per 4-pack
800-279-4441, rockler.com

Rout endless cabinet door combos with one bit set

Freud's Premier Adjustable Rail and Stile set gives you the ability to create cope-and-stick doors from ⅜" to 1" thick with stub tenons, long tenons, and narrower grooves for undersized flat panels. Add optional cutters and you can rout profiles on both faces, cut glass-panel beads, or increase the door thickness to 1¼".

Freud
Premier Adjustable Rail and Stile Router Bit Set, $120
800-334-4107, freudtools.com



Jazz up cabinet face frames with decorative beaded details

Until now, to make a beaded face frame you had two choices: buy a specialty machine that costs thousands of dollars or mill and mount thin strips with rounded edges to your existing frames. Now Kreg's Precision Beaded Face-Frame System creates integral beads and mitered joints with a simple setup on your router table. (Use your favorite joinery method, such as pocket screws, biscuits, or loose tenons, to assemble the face frame.) The levered fence mechanism mounts in a standard miter slot and features a flip stop for repeatable measurements. With the standard kit you get a notching bit and ¼" bead bit (both with ½" shanks) and two setup tools. Kreg offers optional bits and setup tools for other bead profiles.

Kreg Tool Company,
Precision Beaded Face-Frame System, $500
800-447-8638, kregtool.com

Get the Greene & Greene look without the hassle

Ebony plugs with chamfered ends are a hallmark of Greene & Greene furniture. But these decorative details prove time-consuming to make and fit. FastCap's Artisan Accents plugs provide a shortcut: Simply make a partial mortise with a few mallet taps on the included chisel, and then glue in a synthetic-wood plug for an authentic look. FastCap's square plugs measure 5/16"; the company plans to offer other sizes in the future.

FastCap
Artisan Accents, $20 kit, $5 for 50 plugs
888-443-3748, fastcap.com

Bosch packs user-friendly features into router kit

Not content to simply sit on its award-winning 1617EVSPK two-base router kit—Top Tool in the July 2008 issue of *WOOD*® magazine—Bosch rolls out a premium combo kit as an upgrade. Most significant among the changes: finger-grip, lockable triggers on both bases' handles, an industry first for kits with interchangeable motors. The second major feature makes that possible. The motor and base sport electrical contact strips that, when coupled, channel electrical current from the motor to the switch. This kit also features bit-depth micro-adjustment even with the plunge base locked, LED lights around the spindle that remain on with the motor plugged in, and a ball-joint swiveling power-cord mount on the motor.

Bosch
Two-Base Router Combo Kit, #MRC23EVSK, $320
877-267-2499, boschtools.com

SawStop stays competitive with mid-tier tablesaw

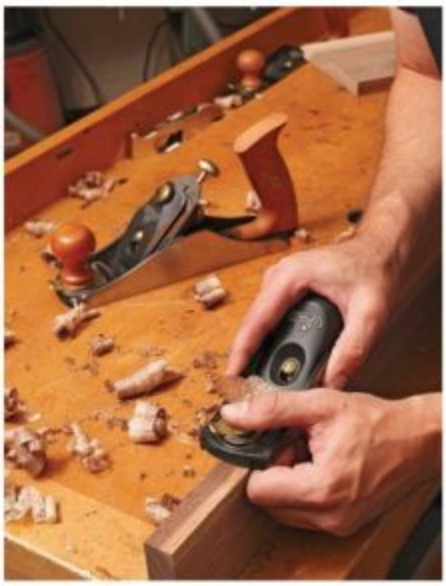
Nearly a decade after the first SawStop tablesaw hit the market, the company has added a third saw to its lineup to give consumers a wider range of choices. The Professional Cabinet Saw is a lighter-duty version of SawStop's Industrial Cabinet Saw, with a different trunnion assembly and dust-collection shroud around the blade. The Professional features a 3-hp motor, 10" blade, riving knife, 36"- and 52"-rip capacities, finger-release throat inserts (*inset*), blade guard with built-in dust port, and SawStop's patented safety blade brake. This tablesaw sells for about $3,000, midway between its Industrial ($4,000-plus) and Contractor saw ($2,000).

SawStop
Professional Cabinet Saw, $3,000
866-729-7867, sawstop.com

There's nothing like a new, er, old sweetheart

Seeking to recapture its one-time dominance in the hand-plane market, Stanley is launching five new Sweetheart Planes, complete with the heart logo and "SW" insignia found on legendary planes of the early 20th century. Made of heavy ductile cast iron with thicker, more durable steel blades than modern Stanley planes and a one-piece frog and base, these recreations are easier to fine-tune. In this lineup: No. 60½ low-angle block plane ($100), a No. 9½ block plane ($100), No. 62 low-angle jack plane ($180), No. 4 smoothing plane ($180), and No. 92 shoulder plane ($180). Additional models will follow.

Stanley Tools
Sweetheart Hand Planes, $100–180
800-262-2161, stanleytools.com



3-speed impacter drives with greater precision

Impact drivers deliver greater torque than standard cordless drill/drivers, but not a lot of control over that power. Makita's lightweight, 18-volt, lithium-ion impact driver (model BTD144) features a category-leading 1,420 inch-lbs of torque, and also has a three-speed transmission. Set it in the low range for small screws that might twist off easily; go to the middle range for common woodworking screws; or switch into high range for demanding fasteners, such as lag screws. And with the variable-speed trigger you can still fine-tune the bit speed within each range.

Makita
18-Volt 3-Speed Impact Driver, $350
800-462-5482, makitatools.com

Make mortises and tenons for half the price

We appreciate Leigh Industries' FMT Frame Mortise & Tenon Jig for its ease of routing perfectly matching mortises and tenons. But its $900 price tag puts it out of reach for most home woodworkers. Now, Leigh's Super FMT does much of what its sibling can, but for half the price. The Super FMT is made of steel rather than aluminum and uses F-style clamps instead of built-in cam clamps. It comes with five 5/16" joint guides for making two dozen sizes of mortise and tenon joints. Leigh sells more snap-in guides as accessories.

Leigh Industries
Super FMT Frame Mortise & Tenon Jig, $450
800-663-8932, leighjigs.com

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HAVE A QUESTION?

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Merit badge for a beginner

Q: I'm an absolute beginning woodworker. I bought a tablesaw because I heard that should be my first tool, but I don't know a rabbet from a box joint. Could you suggest some beginner resources?

—Jonathan Akers, Portland, Ore.

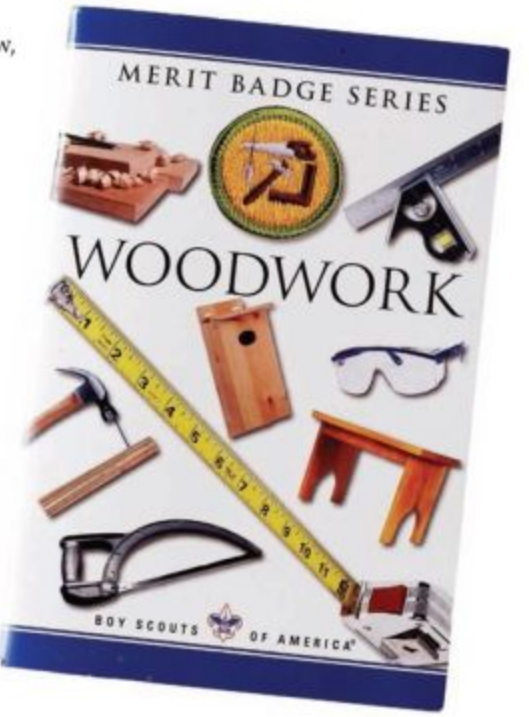
A: Welcome to woodworking, Jonathan. If you're just taking the first steps into this best of all crafts, check out the *Woodwork* merit badge booklet issued by the Boy Scouts of America ($4.50, scoutstuff.org; search for "woodwork"). It's a good starting point that launches you into woodworking inexpensively.

The booklet starts with first aid before moving into the characteristics of trees and lumber, then basic hand tool use. The straightforward projects are designed to bolster your confidence in your tools and build your skillset incrementally.

Before you start up that tablesaw, learn to use it safely. Become thoroughly acquainted with the manual, and then take a look at the safety tips over at woodmagazine.com/tssafety.

Next, take a look at *WOOD*'s Basic Built information (woodmagazine.com/basicbuilt), our initiative to provide high-quality woodworking projects that require a minimum of tools and skills. (We include a Basic Built project in each issue of the magazine.)

Finally, for the inevitable questions and stumbling blocks, head over to woodmagazine.com/forums where you'll find a friendly and knowledgeable community of woodworkers and forum hosts ready to answer your questions.



String stabilizes spindles

Q: As the long spindle I was turning became narrower, it began vibrating with a whipping motion. How do I eliminate the vibration?

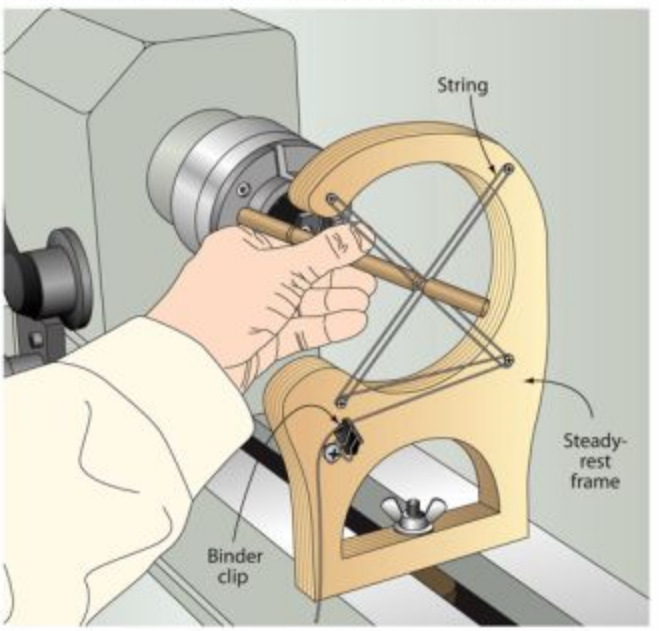
—Roger Hastings, Escondido, Calif.

A: If sections of your spindle are still rough, Roger, first turn the entire spindle down to a cylinder. This ensures that the stock is centered and balanced on the lathe. Slow the turning speed down and keep your tools sharp to dampen any chatter.

If you find that the spindle still gets whippy, consider using one or more commercially-available spindle steady rests for added support on the spindle's narrower sections. For a low-cost solution, make your own simple steady-rest, like the one shown at *right*.

Begin by laying out the shape on plywood, centering the rest's opening on your lathe's chuck. Mark the positions of the four screws such that an X drawn between them crosses at the center point. Then, bandsaw the frame to shape and drive the screws. Screw a small office binder clip to the lower left of the rest's base. Next, attach a block of wood with a bolt and wingnut to clamp the rest to the ways of the lathe bed.

Tie a sturdy string to the bottom left screw. Then, with the spindle chucked in the lathe and centered in the rest, wrap the string around the screws in this sequence to capture the spindle: top right, bottom left, bottom right, top left, and bottom right. Finally, clip the end of the string into the binder clip to hold it tight. Make as many string steadies as you need to support the narrow sections of the spindle.



continued on page 74

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BEST OVERALL	2007	2007	TOP TOOL

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Raise your drooping wings

Q: The cast iron wings on my tablesaw droop approximately 1/16" to 1/8" at their ends. How do I correct this?

—Donald Zarate, Las Vegas, Nev.

A: Your first step, Donald, should be to remove the wings completely. With a fine file or 220-grit sandpaper, sand the mating edges of the wings to remove any sharp edges, burrs, or paint. Then, reattach the wings without tightening the bolts all the way; allowing the wings to sag a small amount.

Lay a 4' level across the front edge of one wing and the tablesaw, and clamp it to the outer edge of the sagging wing. As you tighten the front bolt, keep an eye on the bottom of the level. Ideally, when the bolt is tight, the bottom of the level should sit flush across the tablesaw and the wing.

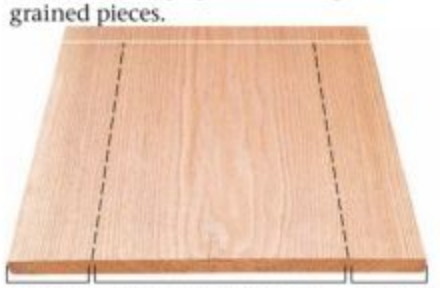
If there is still a gap, the bottom edge between tablesaw and wing needs shimming. Cut strips of brass shim stock (or use cut-up beverage cans). Loosen the bolt, slide in a shim, and retighten. If the gap doesn't close completely, repeat the process, adding a shim each time, until the tables are flush. Lastly, repeat the leveling process at the center and rear of the wing.

Cut out cupping

Q: I would like to make a box with a top that's 13" wide using a 14"-wide mahogany board. Will there be a problem using a single board for the top?

—Jim Curtis, Longboat Key, Fla.

A: A board that wide will most likely cup unless the grain is riftsawn or preferably quartersawn, Jim. Imagine the end grain's growth rings as curved bands under tension to straighten out. The wider the board and the more the grain runs parallel to the surface, the more likely that tension will be released with time or after you joint and plane the pieces. For a panel as wide as your box top, we prefer to glue-up boards no wider than 5" and preferably 4". If there's a riftsawn or quartersawn grain section at the edges of your 14" boards, cut away the flatsawn cathedral-grain section and edge-glue the straight-grained pieces.



continued on page 76

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Hundreds of woodworkers have uploaded their project photos to this contest—now it is up to you! Cast your votes and determine the winners. There are six categories and over $6,700 in prizes at stake!

Two months of voting begins Dec. 1, 2009.

You can still upload your project photos by Nov. 30 to be eligible to win!

To learn more about the **Woodworking Showdown**, cast your votes, and find great project ideas, visit:

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Ask WOOD

A sticky solution for securing patterns

Q: I'm a beginning woodworker with a basic question: For making templates out of medium-density fiberboard (MDF), what's the best way to secure paper patterns to MDF—double-faced tape, glue, or something else?

—Erick Olsen, Methuen, Mass.

A: Stick to spray adhesives (such as 3M Spray Mount) for securing paper patterns to wood, Erick. Spray the paper with adhesive. Take care to avoid overspray on your workbench, or consider a dedicated spraying surface, such as the one *below* from issue 111, page 20 (plans available for free at woodmagazine.com/adhesivedrawer).

For the strongest bond, place the paper on the MDF blank right away. If you'd like to remove the pattern later, wait about a minute for the adhesive to become tacky before pressing the pattern to the wood. Once you've cut your MDF template, simply peel the pattern away. If you have trouble removing the pattern, brush on paint thinner. The solvent will soak through the paper and soften the adhesive, making the pattern easier to remove.

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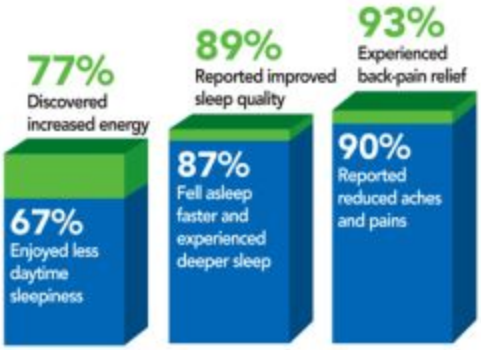

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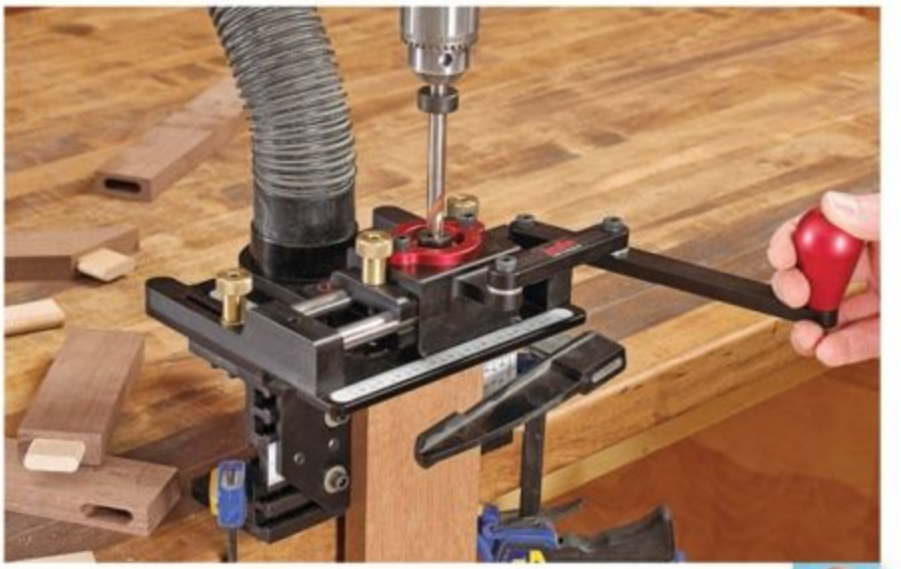
We test hundreds of tools and accessories, but only those that earn at least three stars for performance make the final cut and appear in this section. Prices are current at the time of article production and do not include shipping, where applicable.

Make quick, clean mortises using your handheld drill

With JessEm's Zip Slot Mortise Mill, you simply install the special drill bit—a hybrid of a twist bit and a spiral router bit—in your drill, clamp your workpiece to the jig, and press the spinning bit down as you slide the carriage back and forth. Repeat on the mating piece and insert a loose tenon, or machine a tenon onto that piece.

I drilled mortises up to 3½" wide and 1⅜" deep in hardwoods and softwoods, end grain and edge grain, making every type of mortise-and-tenon joint I could think of, and always arrived at a perfect fit. Steep flutes on the bit clear chips quickly to avoid overheating and dulling the bit. Etched markings and dead-on scales on the mill and a depth-stop bit collar work so well the system's nearly foolproof.

The model 8100 Mortise Mill comes with a ⅜" bit-and-bushing assembly and a handful of solid-wood tenons. You can also buy bit-and-bushing kits in ¼" ($25) and ½" ($33) for use with this model. Or, opt for the Pocket Zip Slot Mortise Mill (not shown), a smaller model that makes only ¼" mortises. Fifty ¼" tenons cost $9, 40 ⅜" tenons are $13, and 30 ½" tenons are $15.



(Editor's note: We tested two of each model. With the first units we had problems getting exact-fitting joints, a problem JessEm traced to faulty bushings. The second units we tested performed spot-on with no problems. JessEm's Patrick Curry said the company has resolved this issue, and that all units on the market have the new bushings.)

—Tested by Erv Roberts, a furniture builder for nearly 50 years

Zip Slot Mortise Mill

Performance		★★★★☆
Price	⅜" standard model, #8100	$250
	¼" pocket model, #8200	$100

JessEm Tool Company
866-272-7492; jessem.com

This shop vacuum holds its own

Ridgid's Smart Cart shop vacuum solves many of the dilemmas common to tub-style vacuums, but it also creates a new problem. First, dust and chips don't build up on the filter—a nice 1-micron model that traps even fine dust—so I didn't have to stop and clean it as often, and it maintains good suction. Second, the two built-in drawers store the five accessory nozzles that always seem to fall off other vacuums, and the sturdy, flat lid works for temporary storage. Finally, this model is noticeably quieter than the screaming vacuum I've used for years. That's a relief for my ears.

But here's the problem: Smart Cart's 8'-long hose measures ½" smaller in diameter than Ridgid's old hose. That makes the 1¾"-diameter nozzle unusable in the more common 2½" ports on my router table and other tools without resorting to adapters or duct tape.

—Tested by Bob Hunter, Tools & Techniques Editor

Smart Cart wet-dry vacuum, #WD7000

Performance	★★★☆☆
Price	$200

Ridgid
800-474-3443; ridgid.com

continued on page 82

Time travel at the speed of a 1935 Speedster?

The 1930s brought unprecedented innovation in machine-age technology and materials. Industrial designers from the auto industry translated the principles of aerodynamics and streamlining into everyday objects like radios and toasters. It was also a decade when an unequaled variety of watch cases and movements came into being. In lieu of hands to tell time, one such complication, called a jumping mechanism, utilized numerals on a disc viewed through a window. With its striking resemblance to the dashboard gauges and radio dials of the decade, the jump hour watch was indeed "in tune" with the times!

The Stauer *1930s Dashtronic* deftly blends the modern functionality of a 21-jewel automatic movement and 3-ATM water resistance with the distinctive, retro look of a jumping display (not an actual jumping complication). The stainless steel 1 1/2" case is complemented with a black alligator-embossed leather band. The band is 9 1/2" long and will fit a 7–8 1/2" wrist.

True to Machine Art esthetics, the sleek brushed stainless steel case is clear on the back, allowing a peek at the inner workings.

Try the Stauer *1930s Dashtronic* Watch for 30 days and if you are not receiving compliments, please return the watch for a full refund of the purchase price. If you have an appreciation for classic design with precision accuracy, the *1930s Dashtronic* Watch is built for you. This watch is a limited edition, so please act quickly. Our last two limited edition watches are totally sold out!

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Amish mantle and miracle invention help home heat bills hit rock bottom

Miracle heaters being given away free with orders for real Amish fireplace mantles to announce the invention that helps slash heat bills, but Amish craftsmen under strain of Christmas rush force household limit of 2

Save money: only uses about 9¢ electric an hour; so turn down your thermostat and never be cold again

By Mark Woods
Universal Media Syndicate

GENUINE AMISH MANTLES MADE IN THE USA: Everyone wants to save money on heat bills this winter, so entire Amish communities are working from the crack of dawn to finish. These fine real wood Amish made fireplace mantles are built to last forever. The oak mantle is a real steal at just two hundred ninety-eight dollars because all those who beat the order deadline by calling the National Hotline at 1-866-815-7004 to order the fireplace mantles are actually getting the imported hi-tech *Fireless* Flame HEAT SURGE miracle heaters for free.

(UMS) Everyone hates high heat bills. But we're all sick and tired of simply turning down the thermostat and then being cold.

Well now, the popular HEAT SURGE® miracle heaters are actually being given away free to the general public for the next 7 days starting at precisely 8:00 a.m. today.

The only thing readers have to do is call the National Distribution Hotline before the 7-day deadline with their order for the handmade Amish Fireplace Mantle. Everyone who does is instantly being awarded the miracle heater absolutely free.

This is all happening to announce the HEAT SURGE Roll-n-Glow® Fireplace which actually rolls from room-to-room so you can turn down your thermostat and take the heat with you anywhere. That way, everyone who gets them first can immediately start saving on their heat bills.

Just in time for winter weather, portable Amish encased fireplaces are being delivered directly to the doors of all those who beat the deadline.

These remarkable fireplaces are being called a miracle because they have what's being called the *Fireless* Flame™ patented technology that gives you the peaceful flicker of a real fire but without any flames, fumes, smells, ashes or mess. Everyone is getting them because they require no chimney and no vent. You just plug them in.

The *Fireless* Flame looks so real it amazes everybody because it has no real fire. So what's the catch? Well, soft spoken Amish craftsmen who take their time hand building the mantles have a process that forces a strict household limit of 2 to keep up with orders.

JUST ANNOUNCED: The Heat Surge miracle fireplace has earned the prestigious Good Housekeeping Seal. The product has earned the Seal after evaluation by the Good Housekeeping Research Institute.

"We can barely keep up ever since we started giving heaters away free. With winter just around the corner, everyone's trying to get them. Amish craftsmen are working their fingers to the bone to be sure everyone gets their delivery in time for Christmas," confirms Frederick Miller, National Shipping Director.

"These portable Roll-n-Glow Fireplaces are the latest home decorating sensation. They actually give you a beautifully redecorated room while they quickly heat from wall to wall. It's the best way to dress up every room, stay really warm and slash your heat bills all at the same time," says Josette Holland, Home Makeover Expert.

And here's the best part. Readers who beat the 7-day order deadline are getting their imported hi-tech miracle heaters free when encased in the Amish built real wood fireplace mantles. The mantles are being handmade in the USA right in the heart of Amish country where they are beautifully hand-rubbed, stained and varnished.

You just can't find custom made Amish mantles like this in the national chain stores. That makes the oak mantle a real steal for just two hundred ninety-eight dollars since the entire cost of the miracle heater is free.

This free giveaway is the

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HEAT SURGE™
Fireless Flame™

How It Works: The HEAT SURGE miracle heater is a work of engineering genius from the China coast so advanced, you simply plug it into any standard outlet. It uses only about 9¢ of electric an hour on the standard setting. Yet, it produces up to an amazing 5,119 BTU's on the high setting. So watch out, a powerful on board hi-tech heat turbine silently forces hot air out into the room from the vent so you feel the bone soothing heat instantly. It even has certification of Underwriters Laboratories coveted UL listing. It also comes with a limited full year replacement or money back warranty less shipping plus a 30-Day Satisfaction Guarantee. OH and FL resident transactions require the remittance of applicable sales tax. Sorry no shipments to MA residents.

c UL us
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How to get 2 free heaters

The National Toll Free Hotlines are now open. All those who beat the 7-day order deadline to cover the cost of the Amish made Fireplace Mantle and shipping get the HEAT SURGE miracle heater free.

A strict limit of 2 per household has been imposed. Since some home woodworkers want to build their own mantle piece, they are letting people get the imported miracle heater alone for just $249. Or, with the Amish made mantle you get the miracle heater free.

Use the map below to locate the weather zone you live in and call the Hotline number for your zone.

Claim Code: FP9661

■ **ON THEIR WAY:** Christmas orders have turned country roads into pipelines to the big city delivery system. Everybody wants a fireplace that comes fully assembled with a handmade Amish mantle in oak or cherry finish and gets delivered by truck right to your door. All you do is plug it in.

EVERYONE LIVING IN THE **Frigid Zone: 1** START CALLING AT 8:00 A.M. TODAY **1-866-815-7004**

EVERYONE LIVING IN THE **Cold Zone: 2** START CALLING AT 8:30 A.M. TODAY **1-866-815-7110**

EVERYONE LIVING IN THE **Frost Zone: 3** START CALLING AT 9:00 A.M. TODAY **1-866-815-7112**

FOR HEAT SURGE, LLC 8000 FREEDOM AVE., N. CANTON OH 44720

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best way to slash heating bills and stay warm this fall and winter. The HEAT SURGE Roll-n-Glow Fireplace gives you zone heating and all the beauty and warmth of a built-in fireplace but rolls from room-to-room so it can also save you a ton of money on heating bills.

Even people in California and Florida are flocking to get them so they may never have to turn on their furnace all winter. And since it uses only about 9 cents of electric an hour on the standard setting, the potential savings are absolutely incredible.

"We are making sure no one gets left out, but you better hurry because entire communities of Amish craftsmen are straining to keep up with demands. For now, we are staying out of the large national retail stores in order to let readers have two per household just as long as they call before the deadline," confirms Miller.

It's a really smart decision to get two right now because for only the next 7 days you get both miracle heaters free. That's like putting five hundred bucks right in your pocket and you can save even more money on your monthly heating bills.

"Everyone's calling to get one but those who are getting their Christmas shopping done are surprising the whole family by getting two. So when lines are busy keep trying or log onto amishfireplaces.com. We promise to get to every call. Then we can have a delivery truck out to your door right away with your beautiful Heat Surge Roll-n-Glow Fireplace," Miller said.

"You'll instantly feel bone soothing heat in any room. You will never have to be cold again," he said. ■

On the worldwide web:
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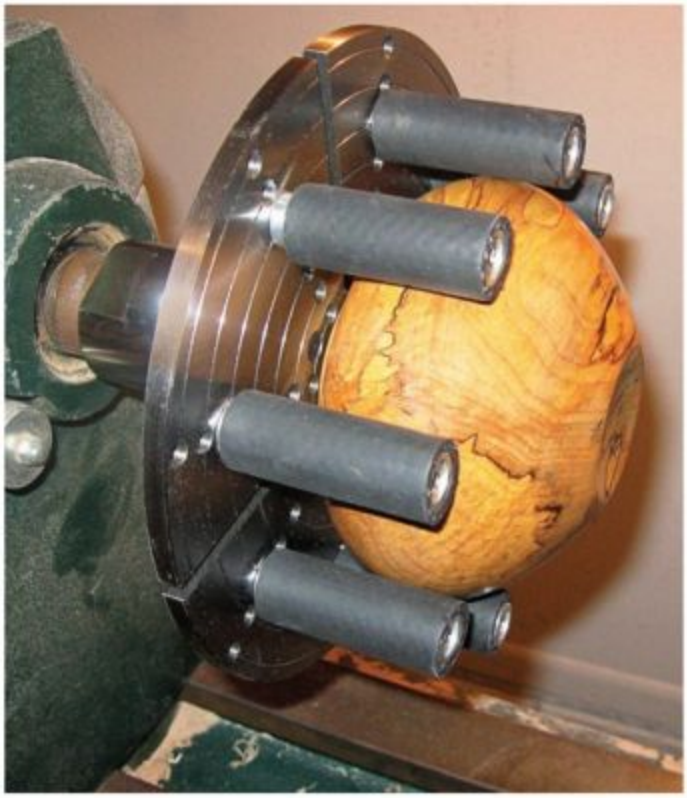
continued from page 78

Long pins solve long-standing vessel-finishing problem

I turn mostly small hollow vessels in my shop, but I've always battled how best to secure them on the lathe while making the finishing cuts on the bottom side. The standard soft jaw pins—usually an inch or so long—on most flat-jaw chucks work great with platters and bowls because the largest diameter is typically on the open end against the chuck. But they're too short to grab vessels like the one shown at *right*.

So earlier this year I discussed this dilemma with Penn State's Ed Levy, who promptly made a set of 2½"-long jaw pins that fit into my chuck's jaws. Problem solved. Now I can shape and sand the bottoms and add finish knowing the rubber pins hold the vessels securely and without damaging the finished sides. These Soft Jaw Pins thread into the jaws of Penn State and Oneway chucks; check with Penn State for compatibility with other makes.

—Tested by Marlen Kemmet, Managing Editor



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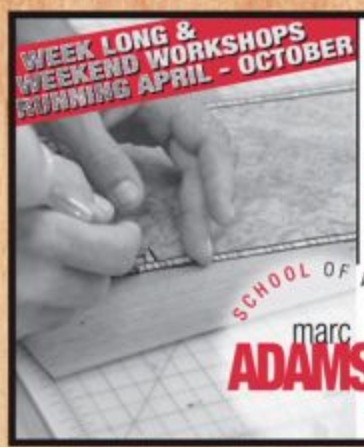

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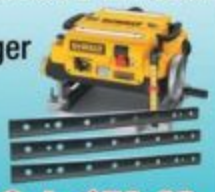

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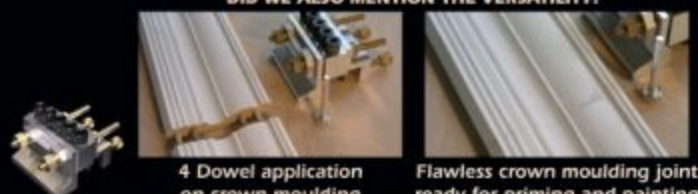

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Benchtop planers

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